

## Air-Cooled Chiller (R410A Inverter Series)

Models: M5ACV 030 CR  
M5ACV 055 CR  
M5ACV 075 CR  
M5ACV 100 CR  
M5ACV 135 CR  
M5ACV 210 CR



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This manual supercedes M5ACV-2008

**Note:** Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equipment.

**Caution:** Sharp edges and coil surfaces are a potential injury hazard. Avoid contact with them.

**Warning:** Moving machinery and electrical power hazards. May cause severe personal injury or death. Disconnect and lock off power before servicing equipment.

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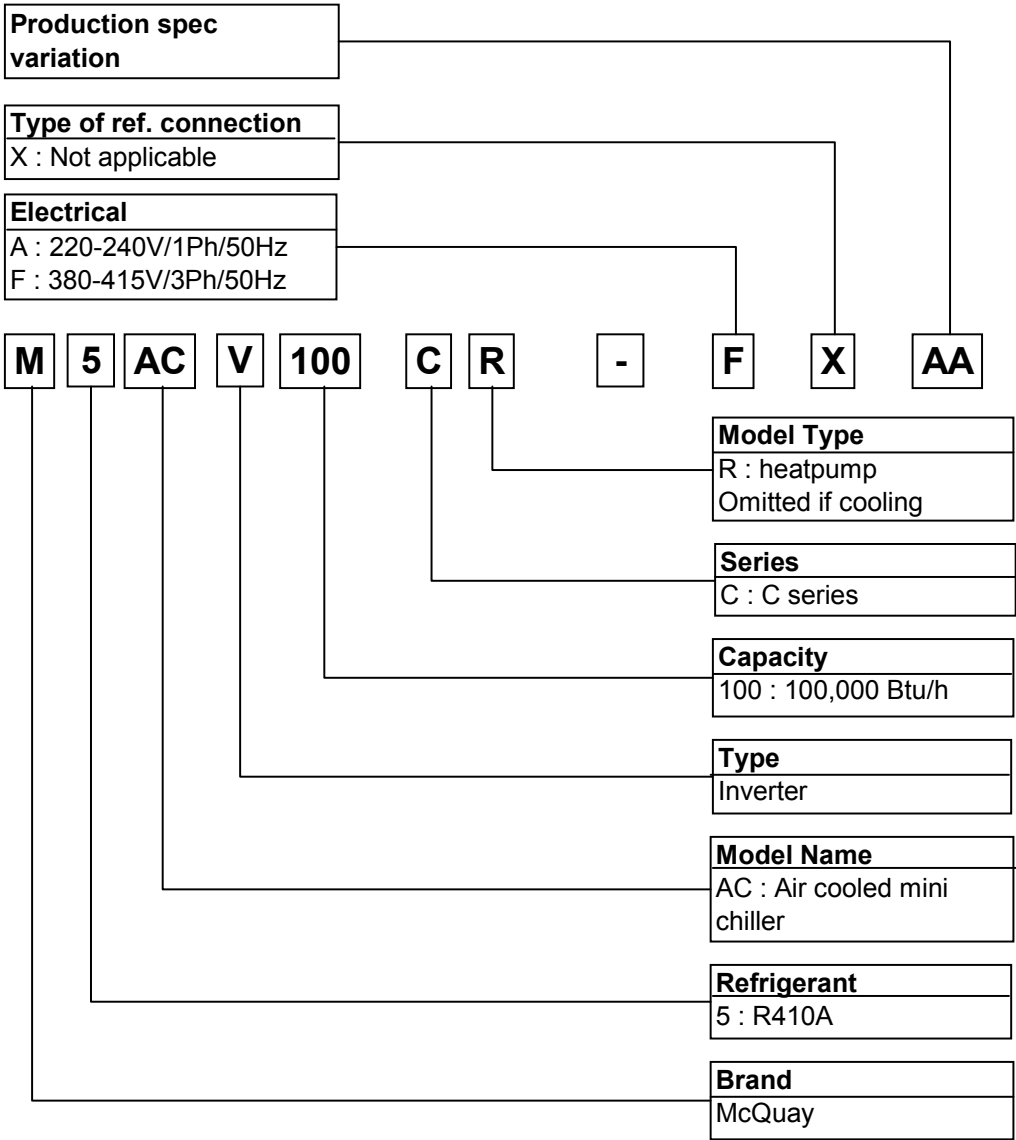
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# Nomenclature



## Product Line Up

### M5ACV Product Line-up

	Heat pump model	Nomenclature	Classification												
			Wired handset WCCH	Gold Fin	Isolator Switch	Terminal block	Scroll compressor	Capillary tube (Normal circuit)	Capillary tube (Normal & Inverter circuit)	EXV (Inverter circuit)	EXV (Normal & Inverter circuit)	Pump only	Brass adaptor BSPT 1 1/4	Brass adaptor BSPT 1	Brass adaptor BSPT 1 1/2
M5ACV	030CR	AXAA	X	X		X	X			X		X		X	
	055CR	FXAA	X	X		X	X			X		X		X	
	075CR	FXAA	X	X		X	X			X		X		X	
	100CR	FXAA	X	X	X		X	X		X		X	X		
	135CR	FXAA	X	X	X		X	X		X		X	X		
	210CR	FXAA	X	X	X		X		X		X	X			X



# Features

## True Dual Circuits BPHE

The true dual BPHE puts the secondary circuit (water) in contact with 2 primary circuits (refrigerant). So even if one primary circuit is shut off, each secondary channel is still in contact with a primary channel.

## Inverter Compressor

Inverter compressor is programmed to run at the optimum speed, which is regulated by the input frequency as it can vary according to the heat load requirement.

Inverter advantages are :

- Less start & stop – Frequency regulated compressor resulting in lesser in the sense of start and stop of compressor, which greatly reduces the energy consumption.
- Fast cooling/heating – Inverter compressor has the ability to produce faster cooling/heating capacity at the frequency higher than the dominant capacity frequency.
- Smart loading/unloading – with the integration of built in system algorithm; inverter compressor could control the system's loading and unloading sophisticatedly.
- Better compressor reliability – Reliability of inverter compressor is always better since there is lesser on/off of the system especially during low load condition.

## Elimination of Water Tank

Inverter system provides constant water temperature band, or much lesser water temperature fluctuation. With this, water tank of the mini chiller system can be eliminated.

## Built in Fan Speed

The built in algorithm now controls fan speed, resulting in cost saving since installation of external FSC (Fan speed controller) can be exempted.

## Safety Protection

- High & low pressure switches
- Anti-freeze protection sensor
- Discharge temperature sensor
- Over pressure relief valve
- Water pressure differential switch
- Anti-freeze heater on BPHE
- Compressor, water pump overload protector

## Anti Corrosion Heat Exchanger

Gold aluminum fin is offered as standard material of the condenser heat exchanger of this series of chiller.

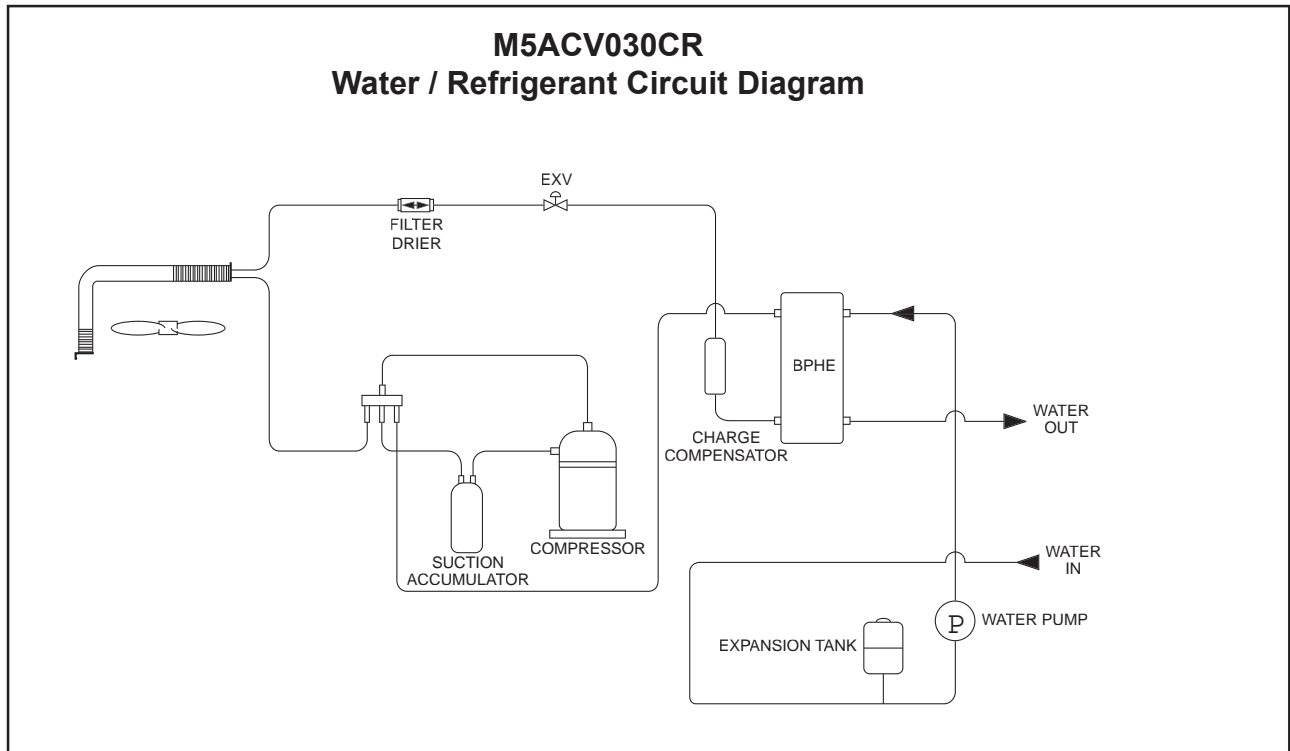
## Modular Installation

A network up to 50 chillers in a system is possible. Control on the operation of the chillers will be done through the microprocessor controller. The external water piping connection can be made either from the left or right side of the unit.

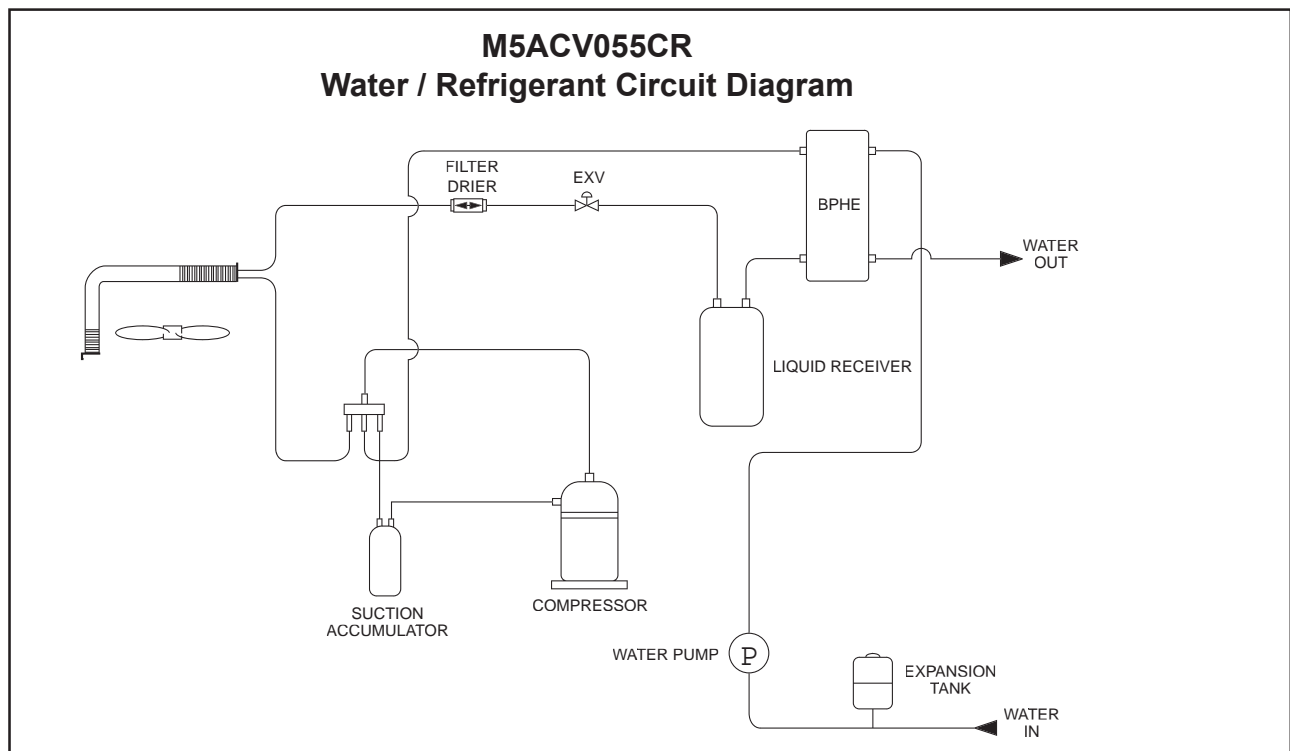
# Application Information

## Refrigerant Circuit Diagram

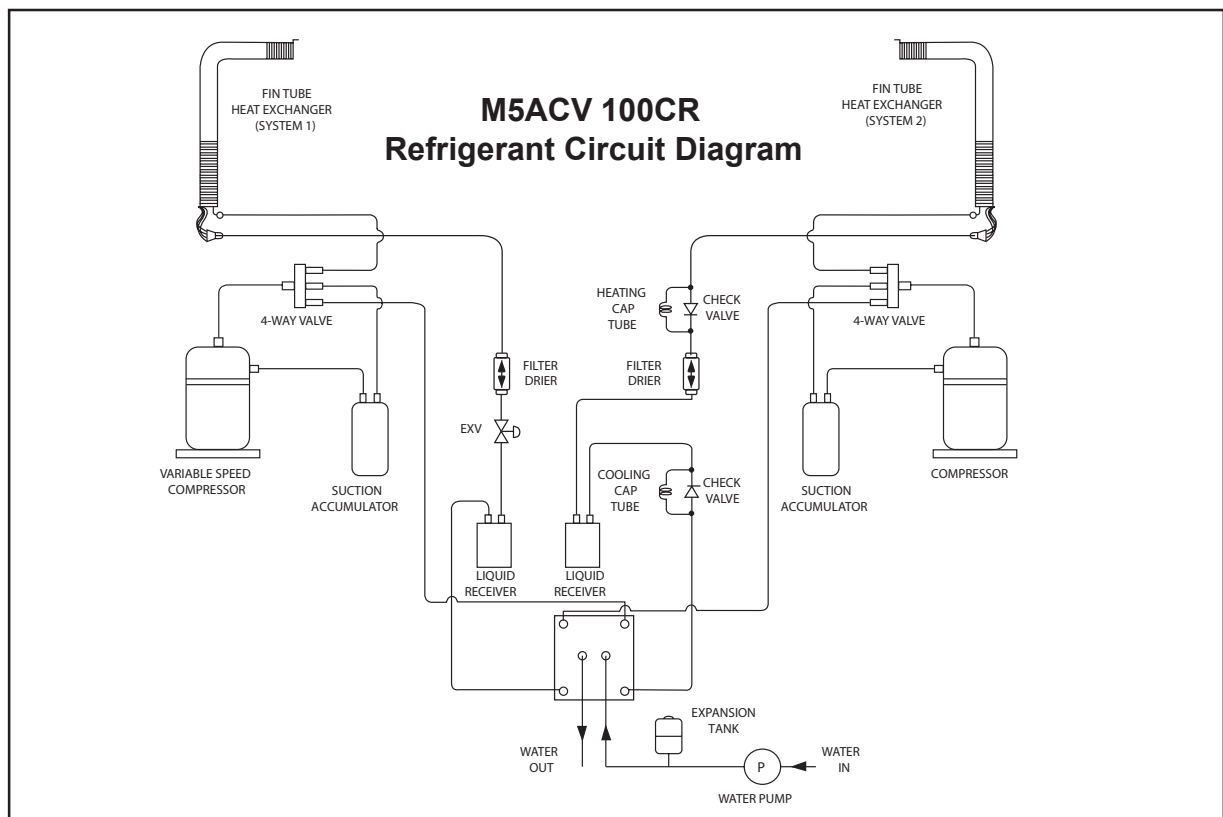
Model : M5ACV 030CR



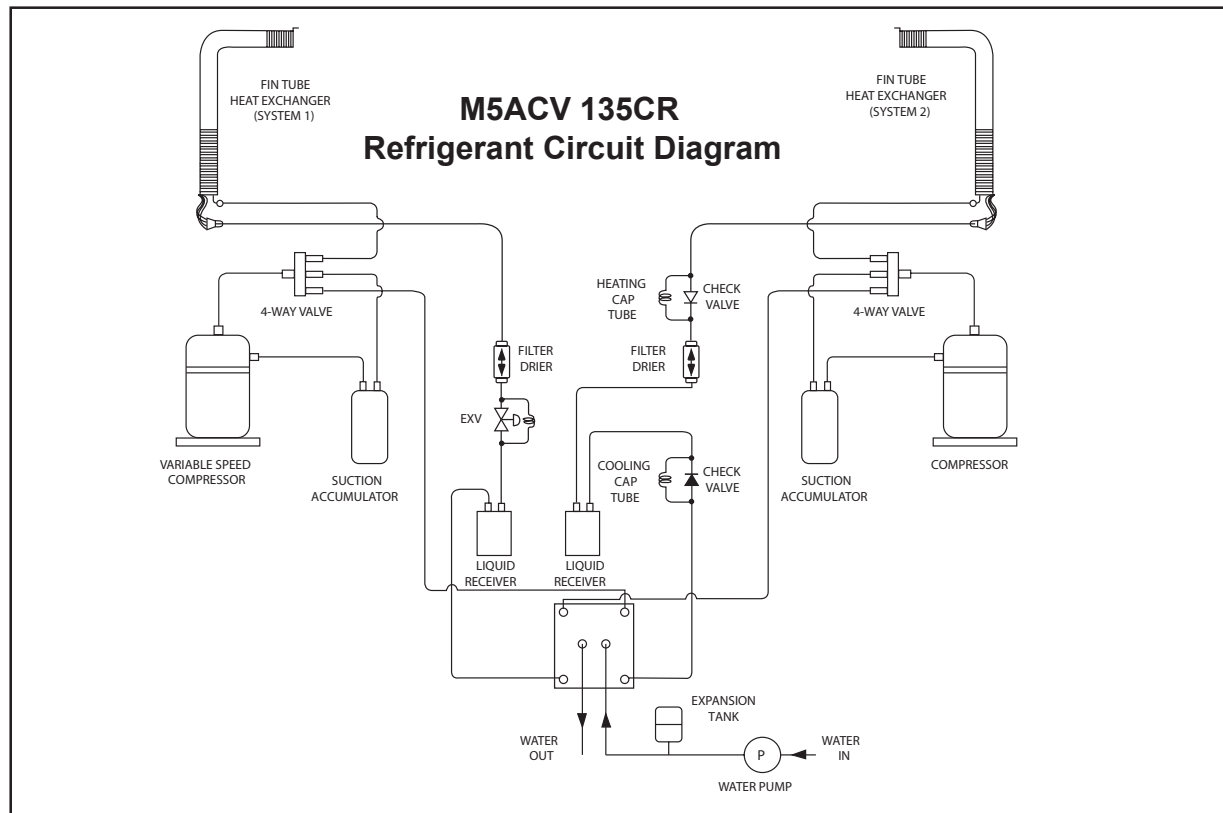
Model : M5ACV 055/075CR



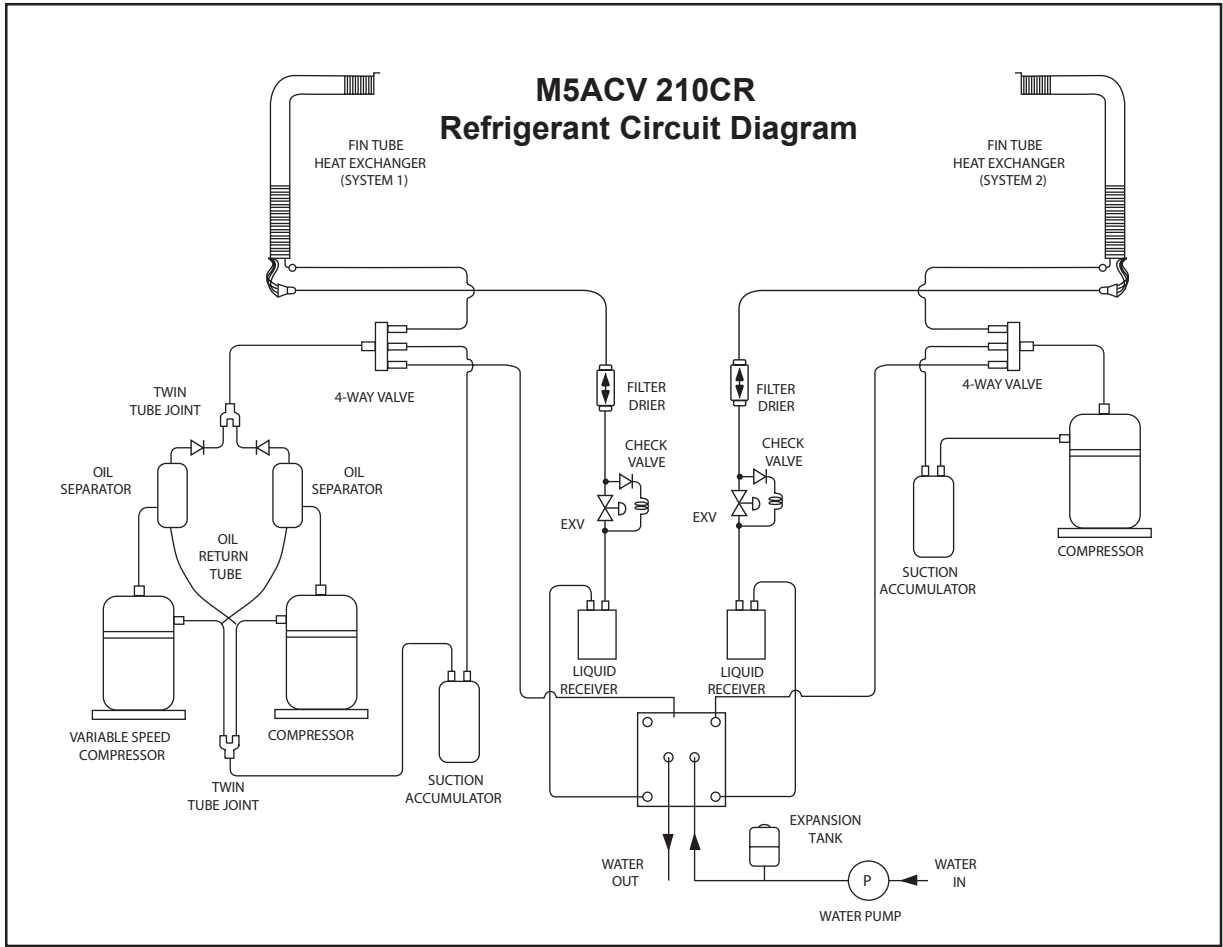
## Model : M5ACV 100CR



## Model : M5ACV 135CR



**Model : M5ACV 210CR**



## Chiller Panel Controller

### 1. Safety Consideration

Only specially trained and technicians and installers are authorized to install and service this equipment.

#### 1.1 General Installation Recommendations

- Only supply DC voltage (9-17V, typically 12V, maximum current 200mA) as a power source to the device.
- Input contact voltage supply should limit to 12VDC or 24VAC.
- Isolated all the low voltage wiring (communication bus, etc) from high voltage power supply wiring.

### 2. General Description

#### 2.1 General

The chiller panel controller is designed to control the chiller operation. This device allows the user to have customized control for each connected unit.

#### 2.2 Features

The requirements of user friendly and easy to use have been taken into account in designing this chiller panel controller. It can do the task as follow:

- Whole system configuration
- Unique parameter settings
- Operation status display
- Tracing fault record (easy in hardware troubleshooting)

The display is shown in an 8-lines graphical LCD display. There are 8 dedicated keys available in the panel,

- Menu selection
- Navigation on the screen
- Modification of the selected value

During first start-up, the panel will have a default configuration (timer schedule, set point, miscellaneous settings, etc). User can do the changes on that particular configuration later.

#### 2.3 Panel Position

The chiller panel controller can be installed anywhere, as long as it is easy to accessed by authorized personnel.

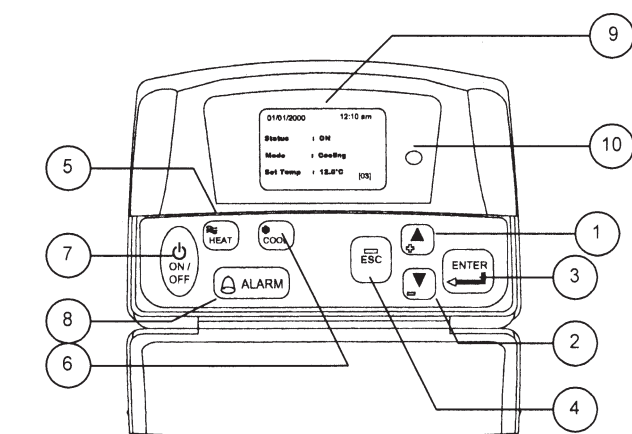
The requirements of installation are:

- Avoid exposure to shocks
- Avoid any source of electromagnetic pollution
- Avoid installation on uneven vertical surface

#### 2.4 Operation Environmental Condition

- Temperature:
  - 10°C to 47°C operating temperature
  - 20°C to 85°C storage temperature
- Relative Humidity:
  - 0 to 95% non-condensing

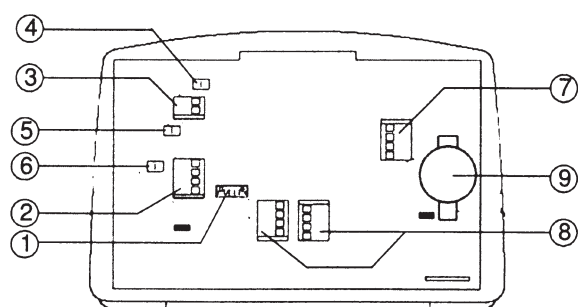
### 3. Hardware Description



Front View

#### Legend

1 & 2	Navigation key
3	Execute instruction key
4	Cancel instruction key
5	Switching to heat mode shortcut key
6	Switching to cool mode shortcut key
7	Toggle ON/OFF shortcut key
8	Show alarm key
9	Graphical LCD display
10	ON/OFF indicator



Back View

#### Legend

1 & 2	Chiller terminal unit connection
3	<i>Not available</i>
4	CMOS reset jumper (JH2)
5	Chiller bus resistor or configuration (JH3)
6	<i>Not available</i>
7	<i>Not available</i>
8	<i>Not available</i>
9	<i>Not available</i>
10	Backup battery

#### 3.1 Key Explanation



The 2 navigation keys permit item selection and modifying the selected value.



ENTER key is used to execute the navigation instruction



ESC key is used to cancel the navigation instruction



Shortcut key to switch the operation mode in the summary pages



Shortcut key to trigger ON/OFF in the summary pages

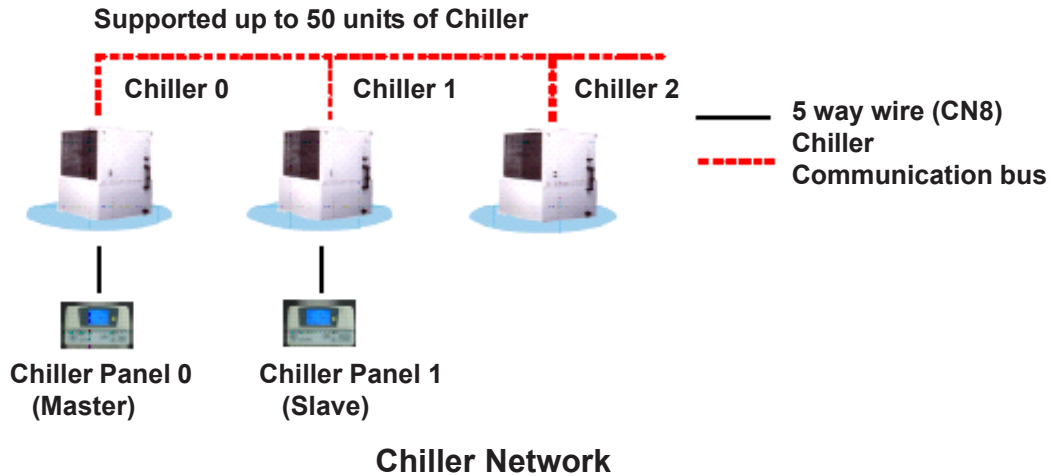


Shortcut key to show fault / alarm in the summary pages



## 4. Installation

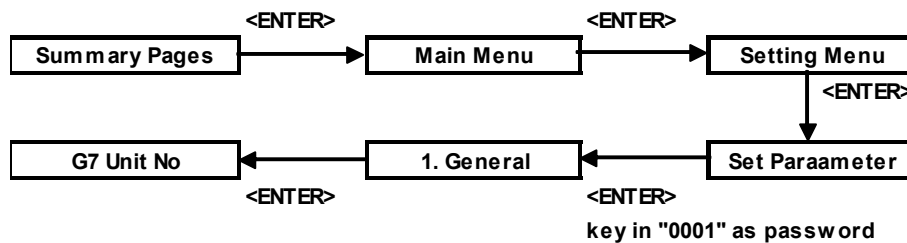
### 4.1 Chiller Bus



Chiller panel needs to be energized with +12Vdc. The 5 way wires that provided is once on the easiest solution to establish a communication between the panel and chiller main board (CN8-JP13). If the 5-way wires socket has been occupied in main board, just using 2 insulation wired are needed to establish a communication between panel and chiller main board.

Chiller panel can support maximum up to 50 units of chiller. In the chiller network, duplication of main board unit address is not allowed. Each chiller main board should have their unique unit address (0-50). For first time running, user need to assign a unique unit address to each main board in the chiller network. User should follow the procedure below:

- Only power ON one main board at once time. Make sure not others main boards are energized.
- By using the panel connected to the main board.



- Key in unique unit address and press ENTER to execute.
- De-energized the main board and repeat the procedures again all the main boards have been assigned a unique unit address.

**IMPORTANT :** Do not assign a same unit address to more than one chiller main board.

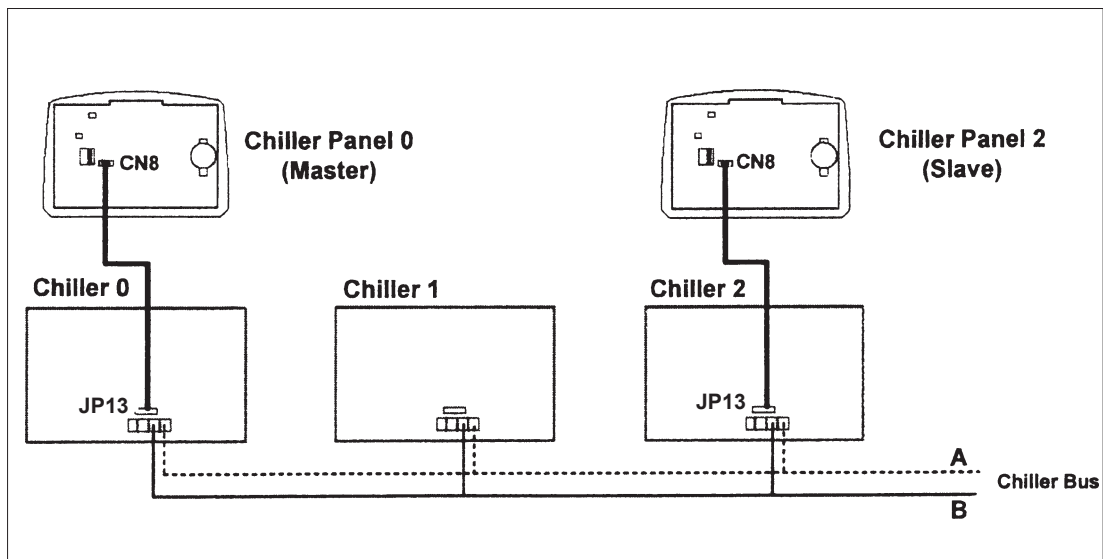
**RECOMMENDATION :** Please select a coherent model (G1 Model) to all the chiller main boards in the same network.

## 4.2 Others Configuration

- JH2 in chiller panel should let it open (put the jumper header on one pin only) all the time unless user need to do CMOS reset to that particular panel.
- JH3 should let it open (put the jumper header on one pin only) all the time as well.
- Remember to put in the coin cell battery on the panel. Without the backup battery, the panel will always reset the time to 12:00am, 1st Jan 2000.

## 4.3 Installation of Chiller Panel Controller

- Disconnect the unit and ensure no others unit energy source that supplies the panel.
- Open the rear panel of the Chiller Panel (insert a 'flat-head' screwdriver in the top joint of main casing with rear panel to open the rear panel).
- Pass the necessary wires of the panel across the large opening in the rear panel. Place the rear panel flat support against the wall and make marks on the wall through the four installation holes (inner and outer).
- Drill four appropriate holes in the marked places.
- Attach the rear panel to the wall and put on the screws on it. Ensure that all cables are passed through the hole of the rear panel.
- Connect the wires to the corresponding terminal according to the wiring bus network. The power supply and communication wires must be correctly connected to ensure that the panel works.
- Close the chiller panel (ensure the bottom joint is aligned for the casing, then complete others joint part. Ensure that the contacts at the back of the panel are aligned with each others).



**Bus Wiring Diagram**

## 5. Software Description

### 5.1 Introduction

The Chiller Panel Controller can be used to control / display the status of Chiller.

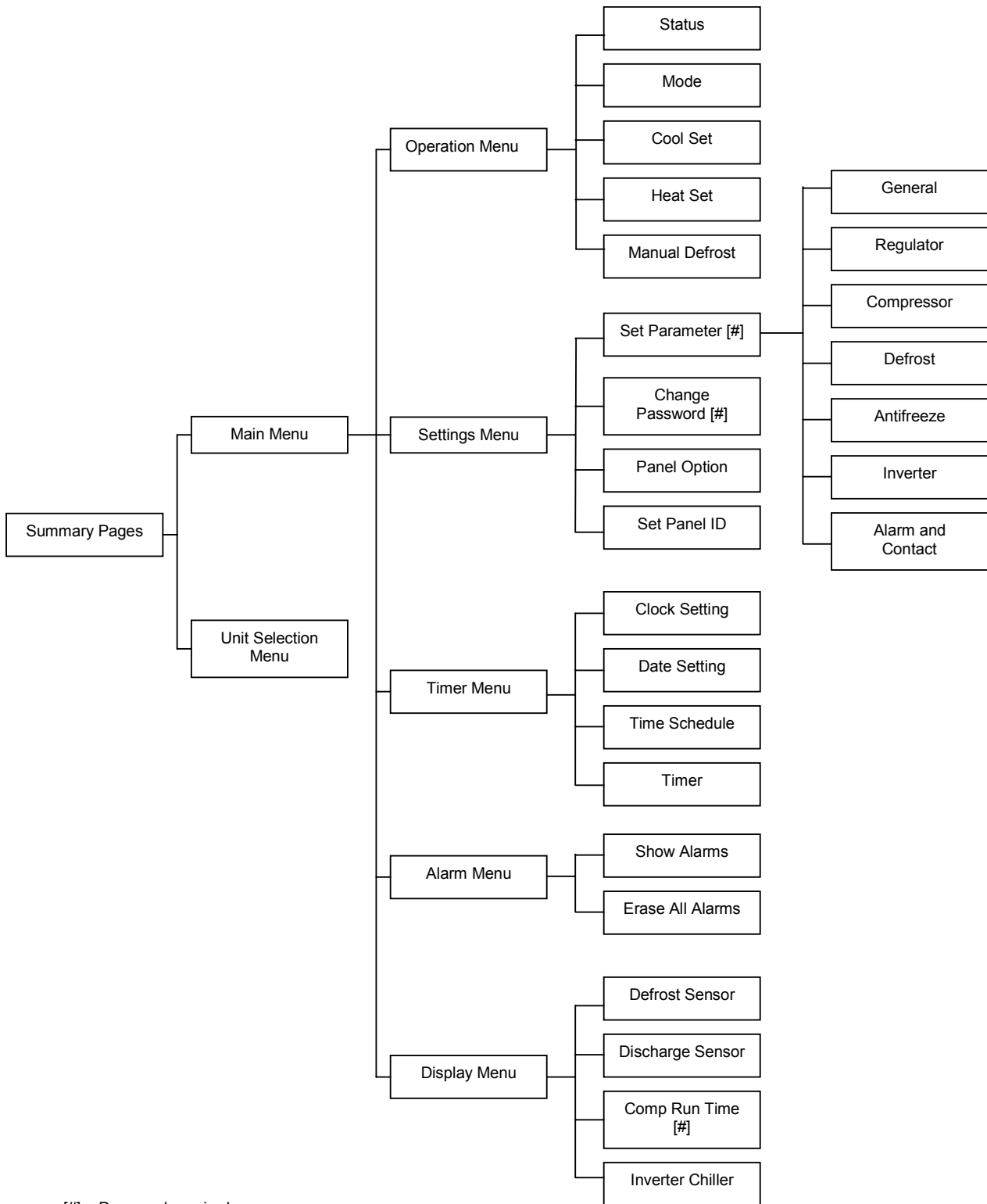
#### Status viewing:

- ON/OFF status
- Mode (Cooling / Heating/ Boiling)
- Mode set temperature
- Compressor status (ON/OFF/ DEFROST)
- Water in, Water Out, Outdoor air and Panel temperature
- Chiller model (Chiller, Heat Pump, Chiller/ Boiler, Chiller+Boiler, Heat Pump/Boiler, Heat Pump+Boiler)
- Advance parameter settings
- Defrost sensor temperatures
- Compressor discharge sensor temperatures
- Compressor run times
- Incoming alarm/ fault/ error

#### Status settings:

- ON/OFF switching
- Mode setting (Cooling / Heating/ Boiling)
- Mode set temperature
- Manual entering defrost
- Advance parameter settings
- Password changing
- Panel option setting (Backlight, Alarm Buzzer, Screen saver, Contrast, Brightness, temperature unit)
- Time and date settings
- Clearing compressor run time

## 5.2 Menu Structures



[#] – Password required

## 5.3 Chiller Menu Structure

### 5.3.1 Summary Pages

There are 4 pages in **[Summary Pages]**. Press **UP** or **DOWN** for page scrolling. Press **ENTER** to go to **[Main Menu]**. Time and date are shown on top of each page. Beside that, the bottom of each page shows current control unit of the Chiller.

For example: [00] - Chiller Panel controls Chiller ID 0 currently  
[03] - Chiller Panel controls Chiller ID 3 currently  
[All] - Chiller Panel controls all Chiller currently

1st page: Display ON/OFF status, Mode settings and Temperature settings.

01/01/2000	12:00am
<b>Status</b>	: ON
<b>Mode</b>	: Cooling
<b>Cool Temp</b>	: 12.0°C
[00]	

2nd page: Display Compressor status.

01/01/2000	12:00am
<b>Compressor</b>	: ON
[00]	

3rd page: Display Water In, Water Out, Outdoor air and Panel temperature

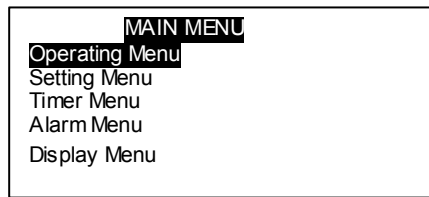
01/01/2000	12:00am
<b>Water In</b>	: 19.8°C
<b>Water Out</b>	: 25.6°C
<b>Outdoor Air</b>	: 32.2°C
<b>Panel</b>	: 20.5°C
[00]	

4th page: Display Chiller model, Compressor No. and Chiller ID.

01/01/2000	12:00am
<b>Model</b>	: Chiller
<b>No. Comp</b>	: 1 Comp
<b>Unit No</b>	: 0

### 5.3.2 Main Menu

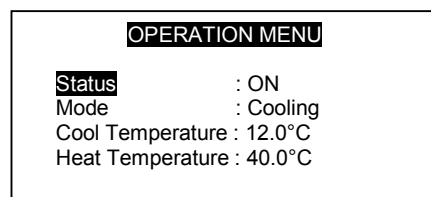
Press **ENTER** in [**Summary Pages**] to go into this menu



There are 5 sub menus in [**Main Menu**]. Press **UP** or **DOWN** to select sub menus, **ENTER** to enter into the sub menu or press **ESC** to exit to [**Summary Pages**]

#### 5.3.2.1 OPERATION MENU

Select [**Operation Menu**] in [**Main Menu**] and press **ENTER** to go into this menu.



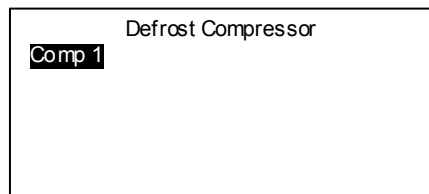
Some normal settings can be found here. Press **UP** or **DOWN** to select each settings, **ENTER** to start the setting or press **ESC** here to exit to [**Main Menu**]

Settings : -ON/OFF unit

- Mode changing (Cooling/ Heating/ Boiling)
- Cooling temperature setting
- Manual Defrost Selection

##### 5.3.2.1.1 Manual Defrost

Select [**Manual Defrost**] in [**Operation Menu**] and press **ENTER** to go into this menu.

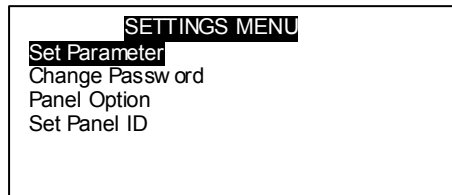


This menu lets user select one compressor to enter into defrost cycle manually, as long as the environment fulfill the defrost requirement.



### 5.3.2.2 Settings Menu

Select [**Settings Menu**] in [**Main Menu**] and press **ENTER** to go into this menu.

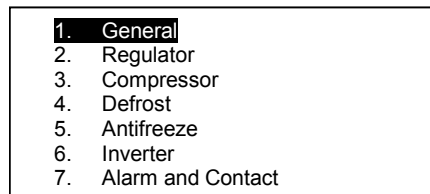


Some advance settings can be found here. Press **UP** or **DOWN** to select settings, **ENTER** to start the setting or press **ESC** here to exit to [**Main Menu**].

- Settings
- Set Parameter
  - Password Changing
  - Panel Option
  - Set Panel ID

#### 5.3.2.2.1 Set Parameter

Select [**Set Parameter**] in [**Settings Menu**] and press **ENTER** to go into this menu.

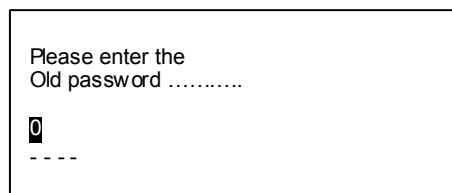


There are 7 groups of advance parameters for user to set in this menu, Press **UP** or **DOWN** to select the group, **ENTER** to go into the group or **ESC** to exit to [**Setting Menu**].

- Settings:
- General
  - Regulator
  - Compressor
  - Defrost
  - Antifreeze
  - Inverter
  - Alarm and Contact

#### 5.3.2.2.2 Password Changing

Select [**Password Changing**] in [**Setting Menu**] and Press **ENTER** to go into this menu.



User can change the old password in this menu.  
Press **ESC** to exit to [**Settings Menu**].

#### 5.3.2.2.3 Panel Option

Select **[Panel Option]** in **[Setting Menu]** and Press **ENTER** to go into this menu.

<b>Backlight</b>	: Normal
<b>Buzzer</b>	: On
<b>Screen Saver</b>	: Disable
<b>Timeout</b>	: 5m
<b>Contrast</b>	: 50%
<b>Brightness</b>	: Medium
<b>Temp Unit</b>	: °C

User can do some miscellaneous for the panel. These settings would not affect whole system performance.

Settings - Toggle Backlight

- Alarm Buzzer
- Enable / Disable Screen Saver
- Screen Saver timeout
- Contrast display
- Backlight brightness
- Temperature unit

Press **ESC** to exit to **[Settings Menu]**

#### 5.3.2.2.4 Set Panel ID

Select **[Set Panel ID]** in **[Settings Menu]** and press **ENTER** to go into this menu.

Please enter the Panel ID.....
=> Unit 0

User can assign the ID no, to the panel.

*Example:* If ID no. 0 has been assigned, the panel acts like Master Panel Unit. It can choose to control each Chiller in the network.

If other ID no. (1-50) has been assigned, the panel acts like Slave Panel Unit. It is dedicated to one particular Chiller. It can only control the Chiller with same ID in the network.

Press **[ESC]** to exit to **[Settings Menu]**

### 5.3.2.3 Timer Menu

Select **[Timer Menu]** in **[Main Menu]** and press **ENTER** to go into this menu.

**TIMER MENU**  
**Clock Setting**  
Date Setting  
Time Schedule  
Timer : Disable

All the timer/ schedule settings are included in this menu. Press **UP** or **DOWN** to select each settings. **ENTER** to start the setting or press **ESC** here to exit to **[Main Menu]**.

Settings:

- Set Clock
- Set Date
- Set Schedule ( 7 days Programmable Timer)
- Enable/ Disable Timer Schedule

#### 5.3.2.3.1 Set Clock

Select **[Clock Setting]** in **[Timer Menu]** and press **ENTER** to go into this menu.

Set Time :  
  
hh:mm  
**00**: 00

User can set the time in this menu. The time setting is in 24-hour format.

Pres **[ESC]** to exit to **[Timer Menu]**.

#### 5.3.2.3.2 Set Date

Select **[Date Setting]** in **[Timer Menu]** and press **ENTER** to go into this menu.

<b>Set Date :</b>  yyyy mm dd  2000 / 01 / 01
---

User can set the date in this menu. The date is set according to sequence below:

(year) / (month) / (day)

Press **[ESC]** to exit to **[Timer Menu]**.

#### 5.3.2.3.3 Set Schedule

Select **[Schedule Timer]** in **[Timer Menu]** and press **ENTER** to go into this menu.

	Timer 1		Timer 2		
	ON	OFF	ON	OFF	
Sun	0800	1600	-----	-----	
Mon	0800	1600	-----	-----	
Tue	0800	1600	-----	-----	
Wed	0800	1600	-----	-----	

This is the 7 days programmable timer schedule menu. There are 2 ON/OFF events in one day. User can choose to set each day of week (Sunday - Saturday) ON/OFF timer. Before this schedule carry their effect to the Chiller, user need to set the **[Timer]** in **[Timer Menu]** to enable.

Press **[ESC]** to exit to **[Timer Menu]**.

#### 5.3.2.4 Alarm Menu

Select **[Alarm Menu]** in **[Main Menu]** and press **ENTER** to go into this menu.

<b>ALARM MENU</b>
<b>Show Alarms</b>
<b>Erase All Alarm</b>

This place keeps records for all previous occurred fault/ alarms. User can view the alarm history and clear that record (alarm history) as well. The panel can keep up to 20 fault/ alarm records.

Press **ESC** to exit to **[Main Menu]**

#### 5.3.2.4.1 Show Alarms

Select **[Show Alarms]** in **[Alarm Menu]** and press **ENTER** to go into this menu.

<b>Alarm 1</b>	[Ch 0]
<b>Comp 1 overload</b>	
01/ 01/ 00	12:00am

User can view all the fault/ alarm records in this menu.

The record shows

- Alarm type
- Alarm occurred date
- Alarm occurred time
- Alarm occurred unit (Chiller ID)

Beside that, user can erase the alarm record in this menu.

Press **[ESC]** to exit to **[Alarm Menu]**.

#### 5.3.2.4.2 Erase All Alarms

Select **[Erase All Alarms]** in **[Alarm Menu]** and press **ENTER** to go into this menu.

<p><b>Are you sure ?</b></p> <p><b>Press Enter to erase,</b> <b>or ESC to exit.</b></p>
---

User can erase all the alarm / fault records at once in this menu.

Press **[ESC]** to exit to **[Alarm Menu]**.

#### 5.3.2.5 Display Menu

Select **[Display Menu]** in **[Main Menu]** and press **ENTER** to go into this menu.

<b>DISPLAY MENU</b>
<b>Defrost Sensor</b>
Discharge Sensor
Comp Run Time
Inverter Chiller

This menu display Defrost Sensor temperature, Compressor Discharge sensor temperature, Compressor Run Time and Inverter Chiller. Beside that, user can clear each Compressor Run Time for Chiller.

Press **[ESC]** to exit to **[Main Menu]**

#### 5.3.2.5.1 Defrost Sensor

Select **[Defrost Sensor]** in **[Display Menu]** and press **ENTER** to go into this menu.

<p><b>Defrost Sensor</b></p> <p><b>Comp 1 : 12.8°C</b></p>
--

User can view the defrost sensor temperature for each compressor in the Chiller.

Press **[ESC]** to exit to **[Display Menu]**

#### 5.3.2.5.2 Discharge Sensor

Select **[Discharge Sensor]** in **[Display Menu]** and press **ENTER** to go into this menu.

<p><b>Discharge Sensor</b></p> <p><b>Comp 1 : 36.5°C</b></p>
--

User can view the discharge sensor temperature for each compressor in the Chiller.

Press **[ESC]** to exit to **[Display Menu]**.

#### 5.3.2.5.3 Comp Run Time

Select **[Comp Run Time]** in **[Display Menu]** and press **ENTER** to go into this menu.

<p><b>Comp Run Time</b></p> <p><b>Comp 1 : 13579h</b></p>
---

User can view the compressor run time for each compressor in the Chiller. Beside that, user can clear each compressor run time in this menu. User needs to key in the correct password before clearing the compressor run time.

Press **[ESC]** to exit to **[Display Menu]**.

#### 5.3.2.5.4 Inverter Chiller

Select **[Inverter Chiller]** in **[Display Menu]** and press **ENTER** to go into this menu.

<p><b>Inverter Chiller</b></p> <p><b>Comp. Freq : 100Hz</b></p> <p><b>Exv. : 180</b></p> <p><b>Comp. Amp : 11.0A</b></p> <p><b>DC Bus : 516V</b></p>	<p><b>Suction : 13.3°C</b></p> <p><b>BPHE in : 6.0°C</b></p> <p><b>BPHE out : 12.9°C</b></p> <p><b>Condenser : 43.0°C</b></p>
--	---

This menu display compressor frequency, EXV opening, DC voltage, Current, Suction Sensor, BPHE in sensor, BPHE out sensor and condenser in sensor.

Press **[ESC]** to exit to **[Display Menu]**.



## 6. Operation User Manual

### 6.1 Starting

Chiller panel can be set as Master or Slave panel unit. When the Panel ID is set to '0', it acts like a Master panel, whereas it is Slave panel if Panel ID is set to others number (1-50).

Chiller panel can control the Chiller if both ID no. (Panel ID and Chiller ID) are same.

For example: Panel ID 1 can only control Chiller ID 1

Master Panel can choose to control each Chiller or control all Chiller at once in the network.

For example : Panel ID 0 (master) can control Chiller ID 0 / ID 1/ ID 32 .... or all Chillers at once.

Panel ID can be set in **Set Panel ID** in **Settings Menu**.

Please enter the  
Panel ID .....

=> Unit 0

## 6.2 CHILLER OPERATION CONTROL

### 6.2.1 STARTING

During power on for the Chiller Panel, it needs to take several times to collect information from the Chiller. At this time, all the status will show "--". Please ensure the particular Chiller exists in the network. When the process is completed, user can start to control the Chiller using the panel.

01/01/2000	12:00am
Status	: --
Mode	: --
Cool Temp	: --
[00]	

*In gathering information process*

01/01/2000	12:00am
Status	: ON
Mode	: Cooling
Cool Temp	: 12°C
[00]	

*Gathering information completed*

### 6.2.2 CHANGING DISPLAY UNIT

Chiller Panel (Master) can choose to choose to control / display each Chiller status. This can be done in [Summary Pages] only.

01/01/2000	12:00am
Status	: ON
Mode	: Cooling
Cool Temp	: 12

*In [Summary Pages], press and hold **ENTER** button (1 second) to go into [Unit Selection] menu.*

Unit Selection	:
Select All	
Select One	: 0

*Select "**Select All**" and press **ENTER** if user want to control all Chiller in the network, or select "**Select One**" to control a particular Chiller. Press **ESC** to exit to [Summary Pages].*

Unit Selection	:
Select All	
Select One	: 0

*Select a Chiller ID via **UP** or **DOWN** and press **ENTER** to confirm or **ESC** to cancel.*

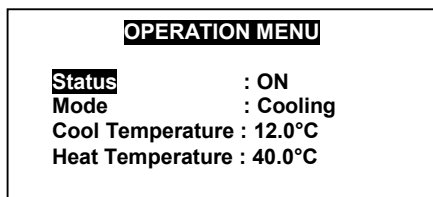
### 6.2.3 Switching On/Off

There are several ways to switch ON/OFF for the Chiller.

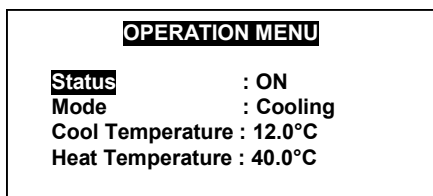
#### i) [Summary Pages]

Press and hold **ON/OFF** button (hold 1 second). Please note that the **ON/OFF** button will only function in [Summary Pages].

#### ii) [Operation Menu]



*In [Operation Menu], select “Status” and press ENTER.*



*Toggle ON/OFF via UP or DOWN button, and then press ENTER to confirm the change or ESC to cancel.*

#### iii) [Timer Menu]



7 days programmable time can turn chiller ON/OFF. User can set the schedule in this [Timer Menu]. Please refer 6.2.11 (page 40) for schedule settings.

## 6.2.4 Switching Mode

There are several ways to switch the mode for the Chiller. Please take note that some mode cannot be set due to current Chiller model settings.

Chiller Model	Mode		
	Cooling	Heating	Boiling
Chiller	√	x	x
Heat Pump	√	√	x
Chiller / Boiler	√	x	√
Heat Pump / Boiler	√	√	√
Chiller + Boiler	√	x	Auto
Heat Pump + Boiler	√	√	Auto

√ - Allow to set  
x - Not Allow to set  
Auto - Turn ON automatically

### i) [Summary Pages]

Cooling - Press and hold **COOL** button.

Heating - Press and hold **HEAT** button (if it allows to set).

Boiling - Press and hold **HEAT** button again (if it allows to set).

### ii) [Operation Menu]



OPERATION MENU	
Status	: ON
Mode	: Cooling
Cool Temperature	: 12.0°C
Heat Temperature	: 40.0°C

*In [Operation Menu], select “Mode” and press **ENTER** to start setting or **ESC** to exit to [Main Menu]*

OPERATION MENU	
Status	: ON
Mode	: <b>Cooling</b>
Cool Temperature	: 12.0°C
Heat Temperature	: 40.0°C

*Toggle **ON/OFF** via **UP** or **DOWN** button, and then press **ENTER** to confirm the change or **ESC** to cancel.*

## 6.2.5 Changing Mode Set Temperature

There are 2 ways to change the mode set temperature for the Chiller.

### i) [Operation Menu]

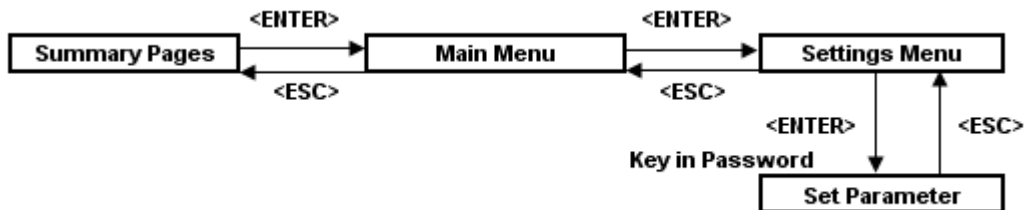


OPERATION MENU	
Status	: ON
Mode	: Cooling
Cool Temperature	: 12.0° C
Heat Temperature	: 40.0° C

In [Operation Menu], select “Cool Temp” / “Heat Temp” and press **ENTER** start setting or **ESC** to exit to [Main Menu].

OPERATION MENU	
Status	: ON
Mode	: Cooling
Cool Temperature	: <b>12.0° C</b>
Heat Temperature	: 40.0° C

Change value via **UP** or **DOWN** button, and then press **ENTER** to confirm the change or **ESC** to cancel.



1. General
<b>2. Regulator</b>
3. Compressor
4. Defrost
5. Antifreeze
6. Inverter
7. Alarm and Contact

In [Set Parameter], select “Regulator” and press **ENTER**. Press **ESC** to exit to [Main Menu].

<b>R1 Cool SP</b>	: 12.0°C
R2 Cool Diff	: 3.0°C
R3 Heat SP	: 40.0°C
R4 Heat Diff	: 3.0°C
R5 Min Cool SP	: -20°C
R6 Max Cool SP	: 40°C
R7 Min Heat SP	: -20°C

Select “R3”/ “R5” and press **ENTER** to start setting or **ESC** to exit to [Set Parameter] menu.

R1 Cool SP	: <b>12.0°C</b>
R2 Cool Diff	: 3.0°C
R3 Heat SP	: 40.0°C
R4 Heat Diff	: 3.0°C
R5 Min Cool SP	: -20°C
R6 Max Cool SP	: 40°C
R7 Min Heat SP	: -20°C

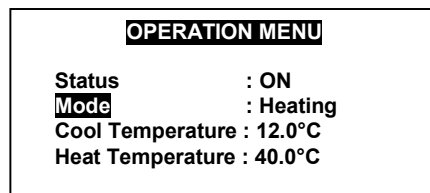
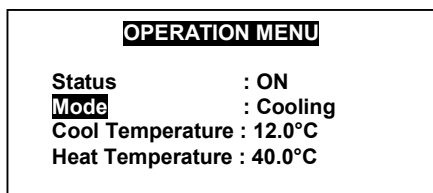
Change value via **UP** or **DOWN** button. The boarderline is limited by **R5&R6** (cool), **R7&R8**(heat). Press **ENTER** to confirm or **ESC** to cancel.

### 6.2.6 Manual Defrost

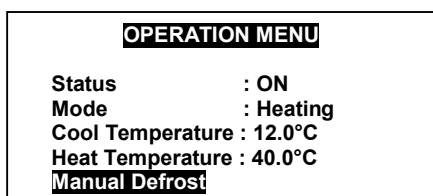
User can choose which compressor will go into manual defrost cycle by using the Chiller Panel, as long as the condition is fulfilled with defrost condition. This can be done in **[Operation Menu]**.



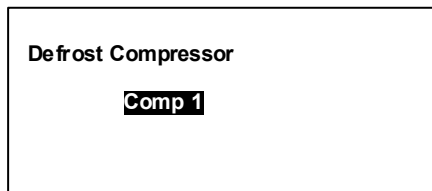
Please take note that “**Manual Defrost**” option will only available in HEATING mode. It will disappear in COOLING/ BOILING mode.



*“Manual Defrost” disappear when Chiller not in HEATING mode*



*In **[Operation Menu]**, select **[Manual Defrost]**, press **ENTER** to go into it, or **ESC** to exit to **[Main Menu]**.*



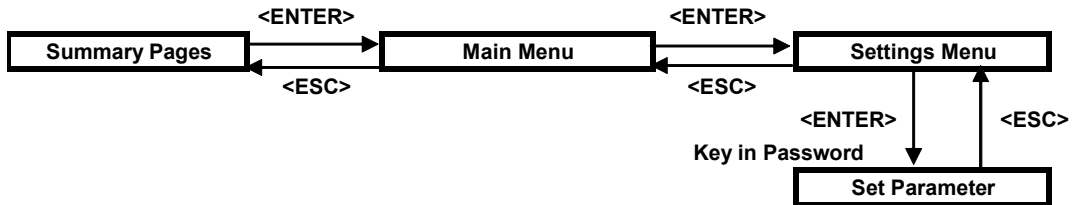
*Select which compressor to go into defrost cycle via **UP** or **DOWN** button. Press **ENTER** to confirm or **ESC** to exit to **[Operation Menu]**.*



### 6.2.7 Advance Parameter Settings

The Chiller Panel provide user a lot of advance parameter settings for the Chiller. The parameters are divided into 7 groups. There all are stored in **[Set Parameter]** menu and it is password-protected layer in the panel.

**\* CAUTION : INPROPER SETTINGS WILL CAUSE PERMANENT DAMAGE TO THE CHILLER !!!**



7 groups of Advance Parameter:

#### 1) General

<b>G1 Mode</b>	: Chiller
<b>G2 No. Comp</b>	: 1 Comp
<b>G3 On/Off in</b>	: Disable
<b>G4 Cool/Heat in</b>	: Disable
<b>G5 Ext Alarm in</b>	: Disable
<b>G6 Water sys</b>	: Isolated
<b>G7 Unit No</b>	: 0

#### 2) Regulator

<b>R1 Cool SP</b>	: 12.0°C
<b>R2 Cool Diff</b>	: 3.0°C
<b>R3 Heat SP</b>	: 40.0°C
<b>R4 Heat Diff</b>	: 3.0°C
<b>R5 Min Cool SP</b>	: -20°C
<b>R6 Max Cool SP</b>	: 40°C
<b>R7 Min Heat SP</b>	: -20°C

<b>R8 Max Heat SP</b>	: 90°C
<b>R9 Ax Heat SP</b>	: 5.0°C
<b>R10 Ax Heat Diff</b>	: 2.0°C
<b>R11 Au Bo SP</b>	: 5.0°C
<b>R12 Au Bo Diff</b>	: 2.0°C
<b>R13 Au Bo Start</b>	: 30m

### 3) Compressor

<b>C1 Min Run</b>	: 12s
<b>C2 Min Stop</b>	: 240s
<b>C3 2On Interval</b>	: 360s
<b>C4 2Cp ON Dly</b>	: 15s
<b>C5 P-Cp ON Dly</b>	: 60s
<b>C6 Cp-P OFF Dly</b>	: 40°C
<b>C7 Cp Cut Off</b>	: 120°C

### 4) Condenser Defrost

<b>D1 Start Temp</b>	: -3°C
<b>D2 End Temp</b>	: 14°C
<b>D3 Max Dura</b>	: 10m
<b>D4 Interval</b>	: 45m
<b>D5 Dly Bfr Def</b>	: 0s
<b>D6 Dly Aft Def</b>	: 0s

### 5) Cool Mode Antifreeze

<b>A1 Heater SP</b>	: 5°C
<b>A2 Heater Diff</b>	: 2.0°C
<b>A3 Sensor</b>	: Leave
<b>A4 Alarm SP</b>	: 3°C
<b>A5 Alarm Diff</b>	: 2.0°C

### 6) Inverter

<b>V1 Cp Freq</b>	: 100Hz
<b>V2 EXV</b>	: 180
<b>V3 Cp Manual</b>	: Disable
<b>V4 EXV Manual</b>	: Disable
<b>V5 Def Mode</b>	: Disable

### 7) Alarm and Contact

<b>P1 FS Confirm</b>	: 5s
<b>P2 FS Delay</b>	: 180s
<b>P3 LP Delay</b>	: 30s
<b>P4 CO Reset</b>	: Manual
<b>P5 HP Reset</b>	: Auto
<b>P6 LP Reset</b>	: Auto
<b>P7 FO Reset</b>	: Manual

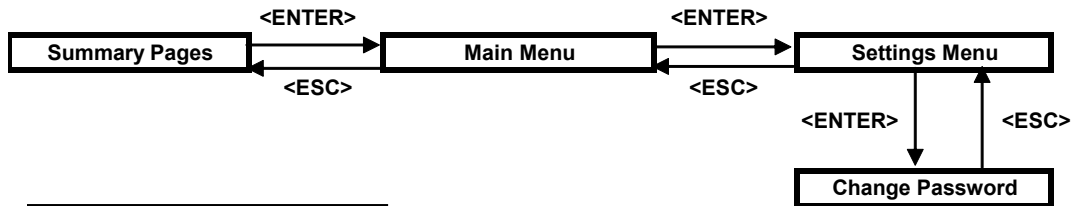
<b>P8 RO Reset</b>	: Manual
<b>P9 FS Reset</b>	: Manual
<b>P10 Aux Reset</b>	: Manual
<b>P11 A/F Reset</b>	: Manual
<b>P12 CO Contact</b>	: Normal
<b>P13 HP Contact</b>	: Normal
<b>P14 LP Contact</b>	: Normal

<b>P15 FO Contact</b>	: Normal
<b>P16 PO Contact</b>	: Normal
<b>P17 FS Contact</b>	: Normal
<b>P18 EA Contact</b>	: Normal
<b>P19 DE Contact</b>	: Normal

Please refer to 8. **APPENDIX** for detail description.

## 6.2.8 Changing Password

For security purpose, some places in the panel are password-protected. User can change the password at anytime.



Please enter the  
Old password .....

0  
----

User needs to enter the old password in order to change the password.

Change the 1st digit value via **UP** or **DOWN**. Press **ENTER** to start enter 2nd digit and the rest, or **ESC** to exit at anytime.

Password accepted . . .  
Access granted !

Password error . . .  
Access denied !

If password correct, this message will be shown and proceed to new password settings.

If password not correct, this message will be shown and exit to **[Settings Menu]**

Please enter the  
New password .....

0  
----

Same as previous, **UP DOWN** to change value, **ENTER** to go to next digit, **ESC** to exit.

User is not allowed to set the password to 0000.

New password  
Has been set .....

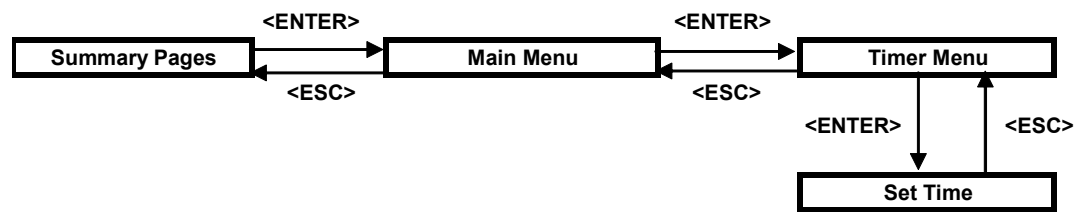
If new password is accepted, this message will be shown and then exit to **[Settings Menu]**.

New password  
'0 0 0 0'  
Is not accepted .....

If new password is '0000', this message will be shown and then exit to **[Settings Menu]**. The password remains as previous.

6.2.9 Clock Setting

User can set the clock for the panel.



Set Time :

hh mm

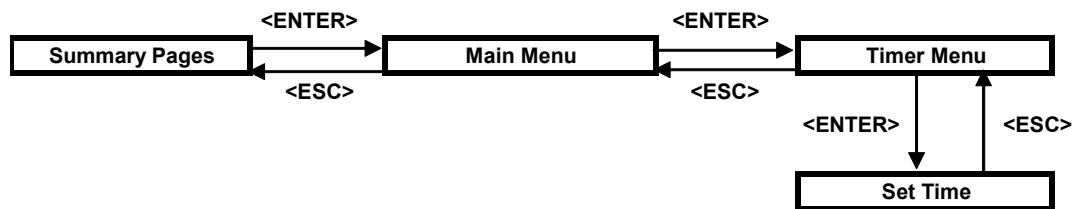
00 : 00

*UP or DOWN to change 'hour'. ENTER to set 'minute' or ESC to exit to [Timer Menu].*

*UP or DOWN to change 'minute'. ENTER to confirm or ESC to set 'hour' again.*

6.2.10 DATE SETTING

User can set the date for the panel.



Set Time :

yyyy hh mm

2000 / 01 / 01

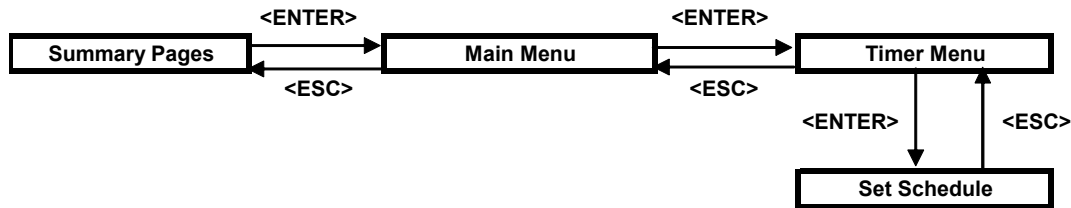
*UP or DOWN to change 'year'. ENTER to set 'month' or ESC to exit to [Timer Menu].*

*UP or DOWN to change 'month'. ENTER to set 'day' or ESC to set 'year' again.*

*UP or DOWN to change 'day'. ENTER to confirm or ESC to set 'month' again.*

6.2.11 7 Days Programmable Setting

The are 2 ON/OFF events in one day for the schedule. This schedule is applicable to all the chillers in the network.



Timer 1		Timer 2	
ON	OFF	ON	OFF
Sun	0800 1600	-----	-----
Mon	0800 1600	-----	-----
Tue	0800 1600	-----	-----
Wed	0800 1600	-----	-----

*UP or DOWN select day of week, ENTER to select event or ESC to exit to [Timer Menu].*

Timer 1		Timer 2	
ON	OFF	ON	OFF
Sun	0800 1600	-----	-----
Mon	0800 1600	-----	-----
Tue	0800 1600	-----	-----
Wed	0800 1600	-----	-----

*UP or DOWN select event. ENTER to start setting or ESC to back to select day of week.*

*Event setting is same like time setting. User can disable the event by set it to '- - -'*

Before the schedule will carry the effect, user need to set **ENABLE** for “**TIMER**” in [Timer Menu].

TIMER MENU	
Set Time	
Set Date	
Set Schedule	
Timer : Disable	

*Select “Timer” and press ENTER to start the settings. UP or DOWN to toggle Enable/ Disable, ENTER to confirm or ESC to cancel.*

## 6.2.12 Viewing Alarm / Erase Alarm Record

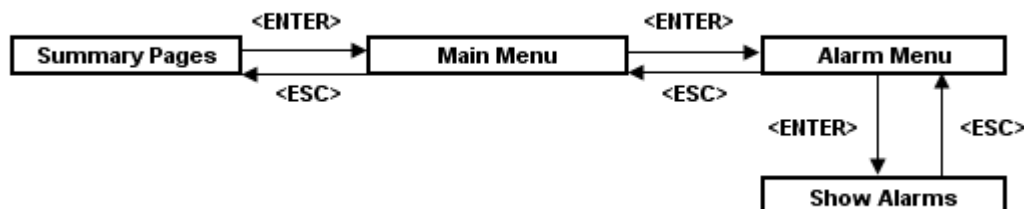
Whenever a new fault/ alarm is occurred, there will be a message pop up to show the fault/ alarm. Backlight will blinking with beeping sound (if “**Alarm Buzzer**” is set ON). If the fault/ alarm has not been dissolved from the Chiller, a sign **[A]** will be shown in the **[Summary Pages]**.(from pop up menu) automatically if the fault/ alarms have been dissolved.

While the fault/ alarms have not been dissolved (sign **[A]**), user can check that fault/ alarm by to into **[Alarm Menu]**. If all the fault/ alarm have been dissolved, user can view the fault/ alarm history records in **[Alarm Menu]** as well. Screen saver will be deactivated while all the alarms have not been dissolved.

If panel ID is set 0 (Master panel), it can receive and view all the fault / alarms from all chillers in the network.

New Alarm 1	[Ch 0]
Comp 1 overload	
12:00am	01/ 01/ 2000

*[Ch 0] show alarm occurred unit.  
Press any button to stop backlight blinking and beeping.  
Press **ESC** again to exit to normal page.*



New Alarm 1	[Ch 0]
Comp 1 overload	
01 / 01/ 00	12:00am

*Press **UP** or **DOWN** to scroll the record.  
Press **ENTER** if user want to erase the record, or **ESC** to exit to **[Alarm Menu]**.*

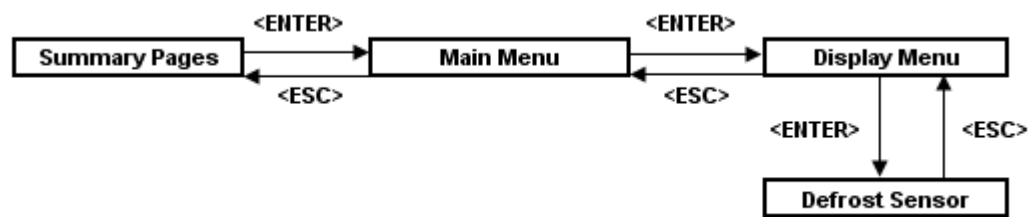
Erase Alarm ?
Please Enter to Erase, Or ESC to exit

*Press **ENTER** to erase the alarm, or **ESC** to cancel.*

User can erase all the fault/ alarm record at once time through **[Erase All Alarm]** in **[Alarm Menu]**.

6.2.13 Viewing Defrost Sensor Temperature

The Chiller Panel displays defrost sensor temperature for each compressor in [Defrost Sensor] in [Display Menu].



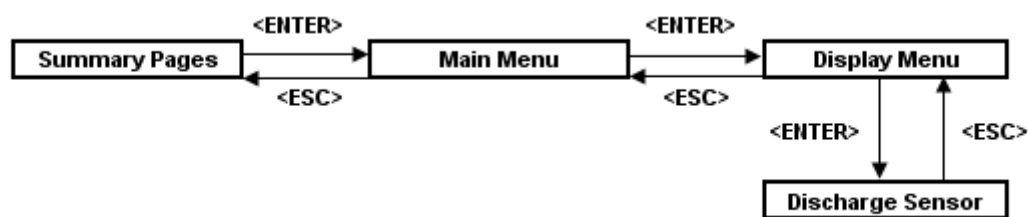
Defrost Sensor

Comp 1 : 12.8°C

Press **ESC** to exit to [Display Menu]

6.2.14 Viewing Compressor Discharge Temperature

The Chiller Panel displays compressor discharge temperature for each compressor in [Discharge Sensor] in [Display Menu].



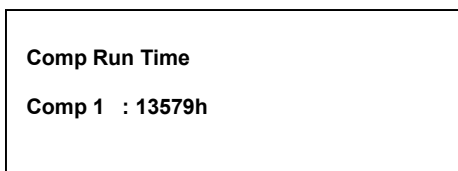
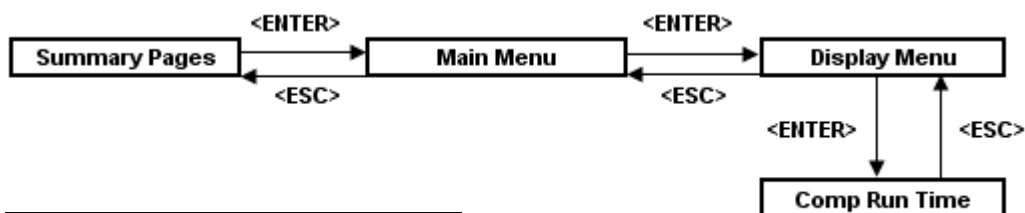
Discharge Sensor

Comp 1 : 36.5°C

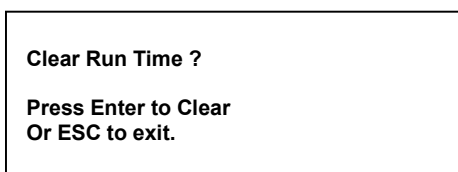
Press **ESC** to exit to [Display Menu]

### 6.2.15 Viewing / Clear Compressor Run Time

User can view/ clear the compressor run time for the Chiller in **[Comp Run Time]** in **[Display Menu]**.

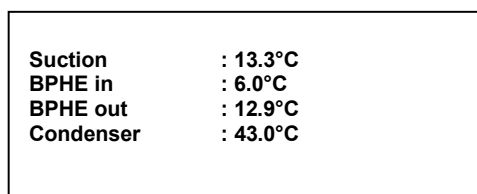
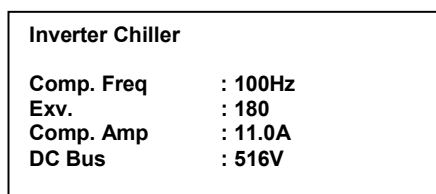
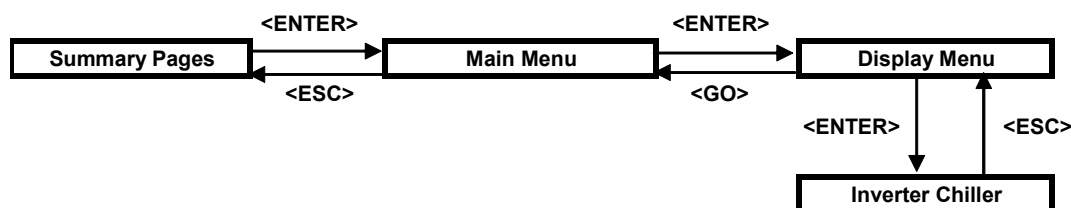


Press **UP** or **DOWN** to select the compressor. **ENTER** to start clear the run time, or **ESC** to exit to **[Display Menu]**.



Press **ENTER** and key in the password to confirm or **ESC** to cancel

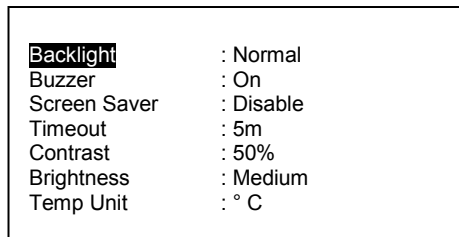
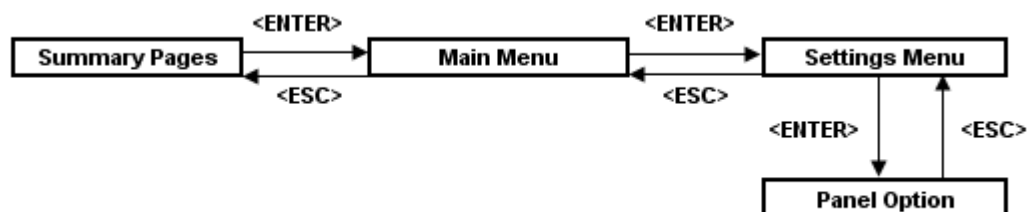
### 6.2.16 Viewing Inverter Chiller



Press **ESC** to exit to **[Display Menu]**

### 6.2.17 Miscellaneous Settings

User can do some miscellaneous settings to the panel.



Press **UP** or **DOWN** to select the item. **ENTER** to set, or **ESC** to exit to **[Settings Menu]**.

Press **UP** or **DOWN** to toggle the value. **ENTER** to confirm, or **ESC** to cancel.



Parameter	Value	Description
Backlight	Normal	Turn ON backlight for 30s via key press
	Always	Always ON backlight
Buzzer	ON	Enable beeping sound when fault/ alarm occurred
	OFF	Disable beeping sound when fault/ alarm occurred
*Screen Saver	Enable	Show screen saver when timeout
	Disable	No screen save
*Timeout	1-30m	Timeout for showing screen saver
Contrast	0-100%	Adjust the contrast setting for the LCD panel
Brightness	OFF	No backlight
	Low, Medium, High	Adjust the backlight intensity
Temp Unit	°C	Display temperature in degree Celsius
	°F	Display temperature in degree Fahrenheit

\* This product must be branded. Screen saver will be deactivated for brand less panel

### 6.3 CMOS Reset

- CMOS reset allows user to reset some settings to default value such as:

Password       -> 0001  
 Backlight       -> Normal  
 Buzzer           -> ON  
 Screen Saver   -> Disable  
 Timeout          -> 5m  
 Contrast        -> 50%  
 Brightness      -> Medium  
 Temp Unit       -> °C

- Procedures

1. Power OFF the panel
2. Close the jumper JH2 with the provided jumper header
3. Power ON the panel and the LCD panel should display as follow:

CMOS is resetting .....

**CMOS reset completed !**  
  
**Please remove JUMPER**  
**and restart the panel**

4. Remove the jumper header (put the jumper header on 1 pin only), power OFF and then power ON the panel.

## 7. Problem and Troubleshooting

	Symptoms	Possible Cause	Troubleshooting
1	Panel gets hot abnormally	- Wiring fault in 12VDC supply	- Change a new panel module and turn ON the unit again after the verification
2	The LCD no display (blank screen)	- Wiring fault in 12VDC supply - No power supply - Voltage supply too low - Module defective	- Correct the wiring problem - Check the wiring and supply 12VDC to panel - Check the power source - Change a new panel module
3	- '-' for all status (quite a long time)	- Panel cannot/ not yet received the information from chiller or FCU completely  - That particular unit address is not recognized by the panel - Module defective	- Ensure the selected unit exists in the network - Ensure the wiring is correct - Ensure the wiring is not defective - Ensure the wiring has been isolated from high power cable - Select a coherent unit address on the panel (refer to 6.2.2) - Change a new module
4	ON/ OFF, COOL or HEAT button not function	- Software limitation - Module defective	- Ensure it is pressed (hold 1s) in [SummaryPages] not in other menu. - Change a new module
5	Cannot switch to HEATING mode	- Software limitation	- Ensure this mode is available in current "Model" of Chiller, please refer to 6.2.4
6	Cannot switch to BOILING mode	- Software limitation	- Ensure this mode is available in current "Model" of Chiller, please refer to 6.2.4
7	No "Manual Defrost" item	- Software limitation	- Ensure current running mode is HEATING
8	Cannot step inside [Set Parameter]	- Software limitation. Panel has not received all the information from chiller completely	- Refer to symptoms 3
9	7 Days Programmable Timer not function	- Software limitation. User did not activate the schedule	Control of Chiller: - Ensure the "Timer" in [Timer Menu] is set ENABLE Control of Chiller: - Ensure the "Timer" in [Operation Menu] is set ENABLE
10	No beeping sound when new alarm occurred	- Software limitation. User did not set ON to the alarm buzzer	- Ensure "Buzzer" in [Panel Option] is set ON
11	No screen saver after timeout	- Software limitation. User did not set ENABLE to the screen saver	- Ensure "Screen Saver" in [Panel Option] I set ENABLE
12	Time always reset to 12:00am, 1st Jan 2000	- No backup battery - Energy of the backup battery is low	- Replace coin cell battery
13	Panel stop operation. Whole operation freezing (hang)	- Unstable power supply - Energy of the backup battery is low	- Power off the panel. Take out the backup battery as well. Replace with a new 3V coin cell battery if necessary. Put back the backup battery into the panel and power on again

## 8. Appendix

	General	Unit	Default	Min	Max	Resolution
G1	Model 0=Chiller 1=Heat pump, 2=Chiller/ Boiler, 3=Heat pump/ Boiler, 4=Chiller+Boiler 5=Heat pump+Boiler	Flag	4 (Chiller+Boiler)	0	2	1
G2	Number of compressor 1=1 compressor, 2=2 compressor, 3=3 compressor, 4=4 compressor	Flag	1	1	4	1
G3	On/Off input 0=disable, 1=enable	Flag	0 (disable)	0	1	1
G4	Cool/ Heat input 0=disable, 1=enable	Flag	0 (disable)	0	1	1
G5	External alarm input 0=disable, 1=enable	Flag	0 (disable)	0	1	1
G6	Water system for chiller network 0=independent, 1=modular	Flag	0 (disable)	0	1	1
G7	Unit number	Flag	0	0	50	1

	REGULATOR	Unit	Default	Min	Max	Resolution
R1	Cooling set-point	°C (F)	12 (53.6)	7(44.6)	20(68)	0.1
R2	Cooling differential	°C (F)	1.5* (2.7)	0.4 (0.7)	10 (18)	0.1
R3	Heating set-point	°C (F)	40 (104)	30(86)	50(122)	0.1
R4	Heating differential	°C (F)	1.5* (2.7)	0.4 (0.7)	10 (18)	0.1
R5	Minimum Cooling set-point	°C (F)	7 (44.6)	-20 (-4)	20(68)	1
R6	Maximum Cooling set-point	°C (F)	20 (68)	7(44.6)	40 (104)	1
R7	Minimum Heating set-point	°C (F)	30 (86)	-20 (-4)	50(122)	1
R8	Maximum Heating set-point	°C (F)	50 (122)	30(86)	90 (194)	1
R9	Auxiliary heater set-point(threshold below below heating set-point)	°C (F)	5 (9)	0 (0)	40 (72)	0.1
R10	Auxiliary heater differential	°C (F)	2 (3.6)	0.4 (0.7)	10 (18)	0.1
R11	Auto boiler set-point(threshold below Heating set-point)	°C (F)	5 (9)	0 (0)	40 (72)	0.1
R12	Auto boiler differential	°C (F)	2 (3.6)	0.4 (0.7)	10 (18)	0.1
R13	Auto boiler start time threshold	min	30	0	199	1

	COMPRESSOR	Unit	Default	Min	Max	Resolution
C1	Compressor minimum run time	sec	120	0	1990	10
C2	Compressor minimum stop time	sec	180	0	1990	10
C3	Time interval between two starts	sec	450	0	1990	10
C4	Start delay between two compressors	sec	15	0	199	1
C5	Pump on →compressor on delay	sec	180	0	1990	10
C6	Comp off →pump off delay	sec	60	0	199	10
C7	Discharge cut-off-set-point	°C (F)	120(248)	0 (32)	150 (302)	1

	CONDENSER DEFROST	Unit	Default	Min	Max	Resolution
D1	Start defrost temperature	°C (F)	0 (32)	-20 (-4)	14(57)	1
D2	End defrost temperature	°C (F)	14 (57)	0(32)	40 (104)	1
D3	Maximum duration of defrost cycle	min	10	1	40	1
D4	Defrost interval time	min	45	0	199	1
D5	Delay before defrosting	sec	0	0	1990	10
D6	Delay after defrosting	sec	120	0	1990	10

	COOL MODE ANTIFREEZE	Unit	Default	Min	Max	Resolution
A1	Antifreeze heater set-point	°C (F)	5 (41)	-40 (-40)	40 (104)	1
A2	Antifreeze heater differential	°C (F)	2 (3.6)	0.4 (0.7)	10 (18)	0.1
A3	Antifreeze sensor select 0=Leaving water, 1=Entering water	Flag	0 (leaving)	0	1	1
A4	Antifreeze alarm set-point	°C (F)	3 (37)	-40 (-40)	40(104)	1
A5	Antifreeze alarm differential	°C (F)	2 (3.6)	0.4 (0.7)	10 (18)	0.1

	ALARM AND CONTACT	Unit	Default	Min	Max	Resolution
P1	Flow switch confirmation time	sec	5	0	199	1
P2	Flow switch alarm delay at pump start	sec	120	0	199	1
P3	Low pressure alarm delay at compressor start up	sec	30	0	199	1
P4	Comp overload alarm reset type 0=Manual reset, 1=Auto reset	Flag	0 (manual)	0	1	1
P5	High pressure alarm reset type 0=Manual reset, 1=Auto reset	Flag	1 (auto)	0	1	1
P6	Low pressure alarm reset 0=Manual reset, 1=Auto reset	Flag	1 (auto)	0	1	1
P7	Fan overload alarm reset type 0=Manual reset, 1=Auto reset	Flag	1 (auto)	0	1	1
P8	Pump overload alarm reset type 0=Manual reset, 1=Auto reset	Flag	0 (manual)	0	1	1
P9	Flow switch alarm reset type 0=Manual reset, 1=Auto reset	Flag	0 (manual)	0	1	1
P10	Auxiliary alarm reset type 0=Manual reset, 1=Auto reset	Flag	1 (auto)	0	1	1
P11	Antifreeze alarm reset type 0=Manual reset, 1=Auto reset	Flag	1 (auto)	0	1	1
P12	Comp overload contact type 0=Normally close(NC) 1=Normally open(NO)	Flag	0 (NC)	0	1	1
P13	High pressure contact type 0=Normally close(NC) 1=Normally open(NO)	Flag	0 (NC)	0	1	1
P14	Low pressure contact type 0=Normally close(NC) 1=Normally open(NO)	Flag	0 (NC)	0	1	1
P15	Fan overload contact type 0=Normally close(NC) 1=Normally open(NO)	Flag	0 (NC)	0	1	1
P16	Pump overload contact type 0=Normally close(NC) 1=Normally open(NO)	Flag	0 (NC)	0	1	1
P17	Flow switch contact type 0=Normally close(NC) 1=Normally open(NO)	Flag	0 (NC)	0	1	1
P18	External alarm contact type 0=Normally close(NC) 1=Normally open(NO)	Flag	0 (NC)	0	1	1
P19	Defrost end contact type 0=Normally close(NC) 1=Normally open(NO)	Flag	0 (NC)	0	1	1

	INVERTER	Unit	Default	Min	Max	Resolution
V1	Compressor frequency	Hz	Auto	0	120	1
V2	EXV Opening	Flag	Auto	0	480	1
V3	Compressor manual setting 0= disable 1= enable	Flag	0(disable)	0	1	1
V4	EXV Manual setting 0=disable 1= enable	Flag	0(disable)	0	1	1
V5	Defrost Mode 0= disable 1= enable	Flag	0(disable)	0	1	1

## Special Precautions When Dealing with Refrigerant R410A Unit

### 1) What is New Refrigerant R410A?

R410A is a new HFC refrigerant which does not damage the ozone layer. The working pressure of this new refrigerant is 1.6 times higher than conventional refrigerant (R22), thus proper installation / servicing is essential.

### 2) Components

Mixture of composition by weight : R32(50%) and R125(50%)

### 3) Characteristic

- R410A liquid and vapor components have different compositions when the fluid evaporates or condenses. Hence, when leak occurs and only vapor leaks out, the composition of the refrigerant mixture left in the system will change and subsequently affect the system performance. **DO NOT** add new refrigerant to leaked system. It is recommended that the system be evacuated thoroughly before recharging with R410A.
- When refrigerant R410A is used, the composition will differ depending on whether it is in gaseous or liquid phase.  
Hence when charging R410A, ensure that only liquid is being withdrawn from the cylinder or can. This is to make certain that only original composition of R410A is being charged into the system.
- POE oil is used as lubricant for R410A compressor, which is different from the mineral oil used for R22 compressor.  
Extra precaution must be taken to avoid exposing the R410A system to moist air.

### 4) Check List Before Installation / Servicing

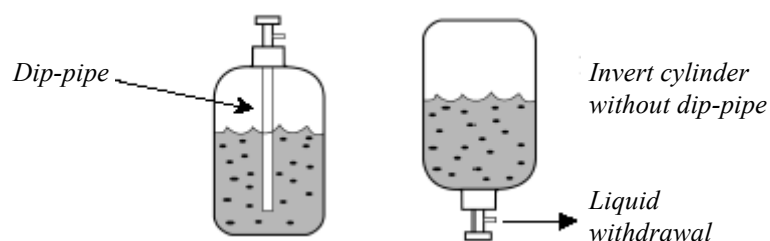
- Tubing  
Refrigerant R410A is more easily affected by dust or moisture compared with R22, make sure to temporarily cover the ends of the tubing prior to installation
- Compressor oil  
No additional charge of compressor oil is permitted.
- Refrigerant  
No other refrigerant other than R410A
- Tools (size of service port is different from R22 system)  
Tools specifically for R410A only (must not be used for R22 or other refrigerant)
  - i) Gauge manifold and charging hose
  - ii) Gas leak detector
  - iii) Refrigerant cylinder/charging cylinder
  - iv) Vacuum pump c/w adapter
  - v) Flare tools
  - vi) Refrigerant recovery machine

### 5) Handling and Installation Guidelines

Like R22 systems, the handling and installation of R410A system are closely similar. All precautionary measures; such as ensuring no moisture, no dirt or chips in the system, clean brazing using nitrogen, and thorough leak check and vacuuming are equally important requirements. However, due to its hydroscopic POE oil, additional precautions must be taken to ensure optimum and trouble-free system operation.

- a) During installation or servicing, avoid prolong exposure of the internal part of the refrigerant system to moist air. Residual POE oil in the piping and components can absorb moisture from the air.
- b) Ensure that the compressor is not exposed to open air for more than the recommended time specified by its manufacturer (typically less than 10 minutes). Remove the seal-plugs only when the compressor is about to be brazed.
- c) The system should be thoroughly vacuumed to 1.0 Pa ( 700mmHg) or lower. This vacuuming level is more stringent than R22 system so as to ensure no incompressible gas and moisture in the system.

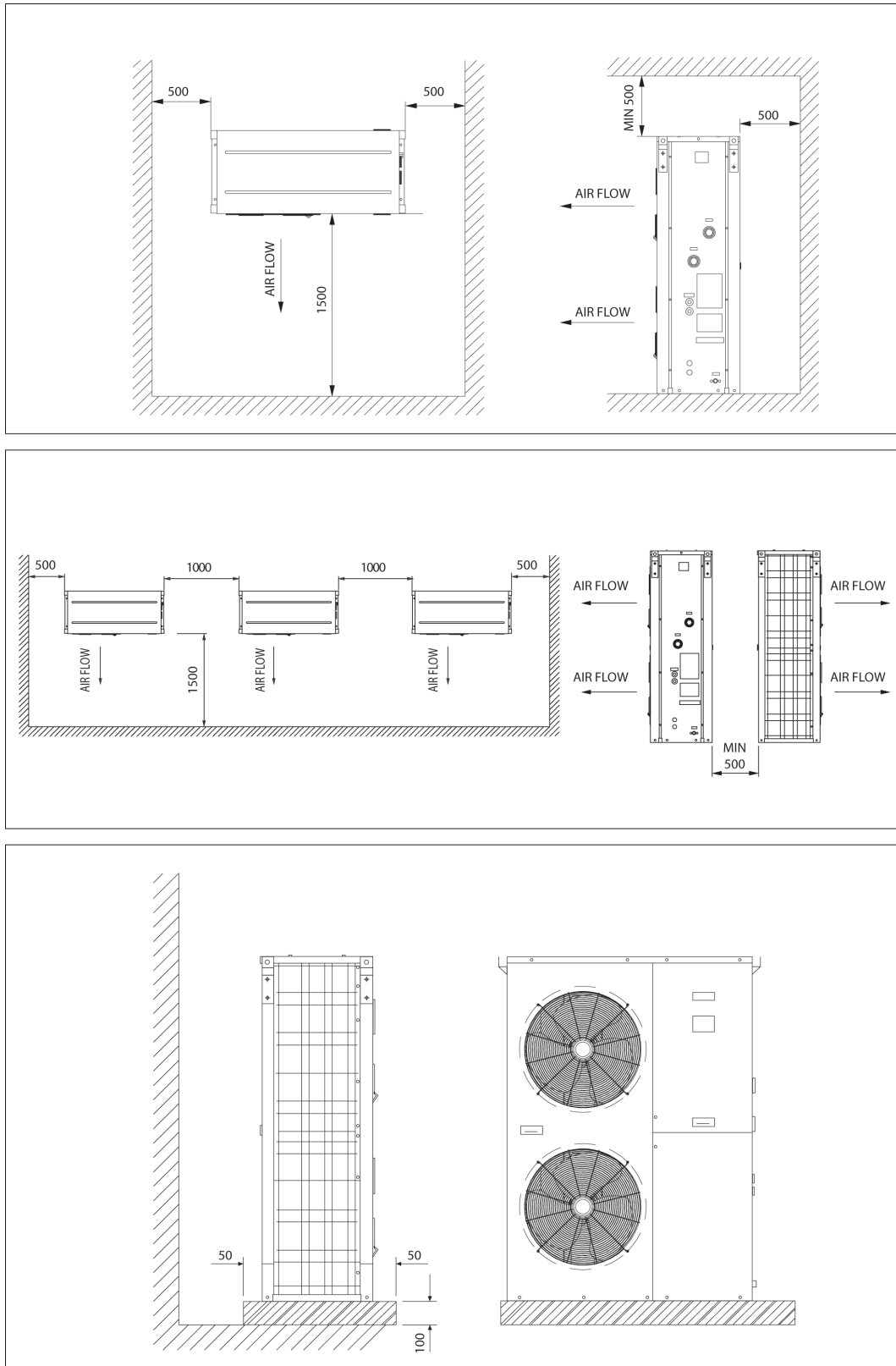
- d) When charging R410A, ensure that only liquid is being withdrawn from the cylinder or can. This is to ensure that only the original composition of R410A is being delivered into the system. The liquid composition can be different from the vapor composition.



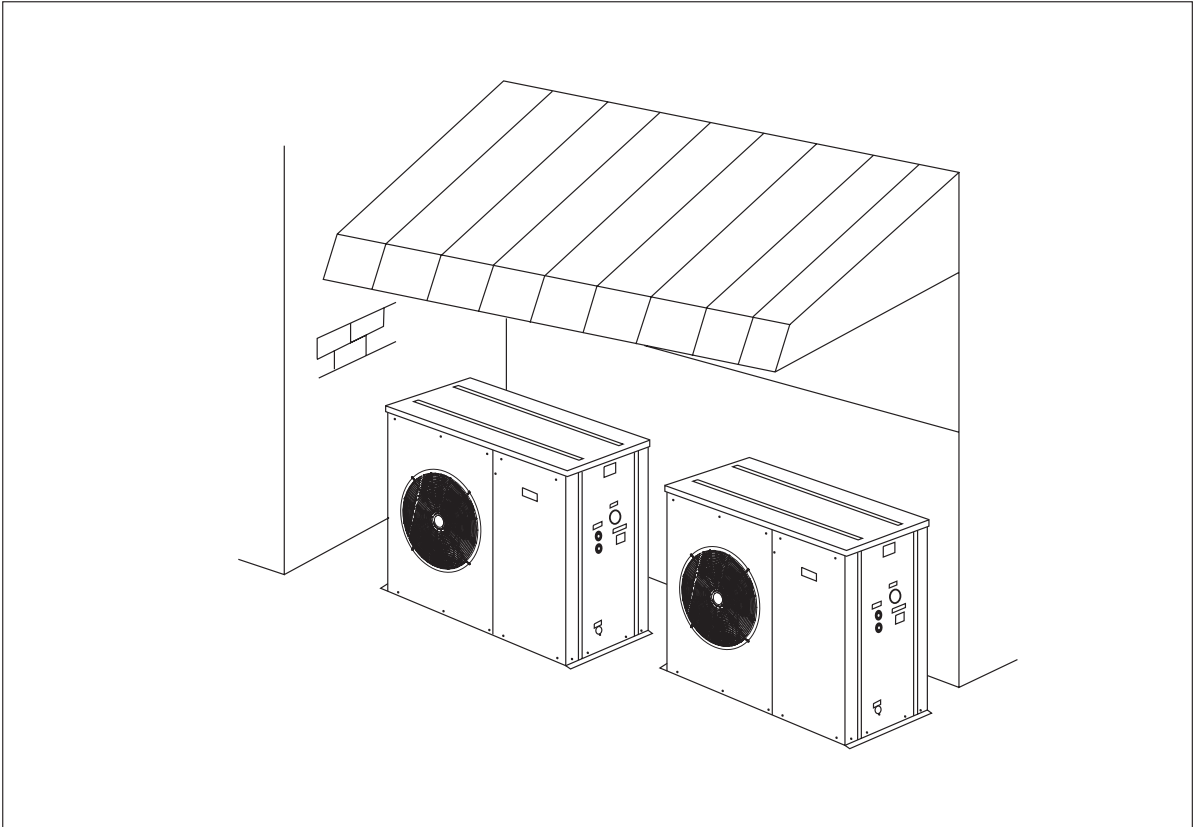
- e) Normally, the R410A cylinder or can is being equipped with a dip-pipe for liquid withdrawal. However, if the dip-pipe is not available, invert the cylinder or can so as to withdraw liquid from the valve at the bottom.

## Installation

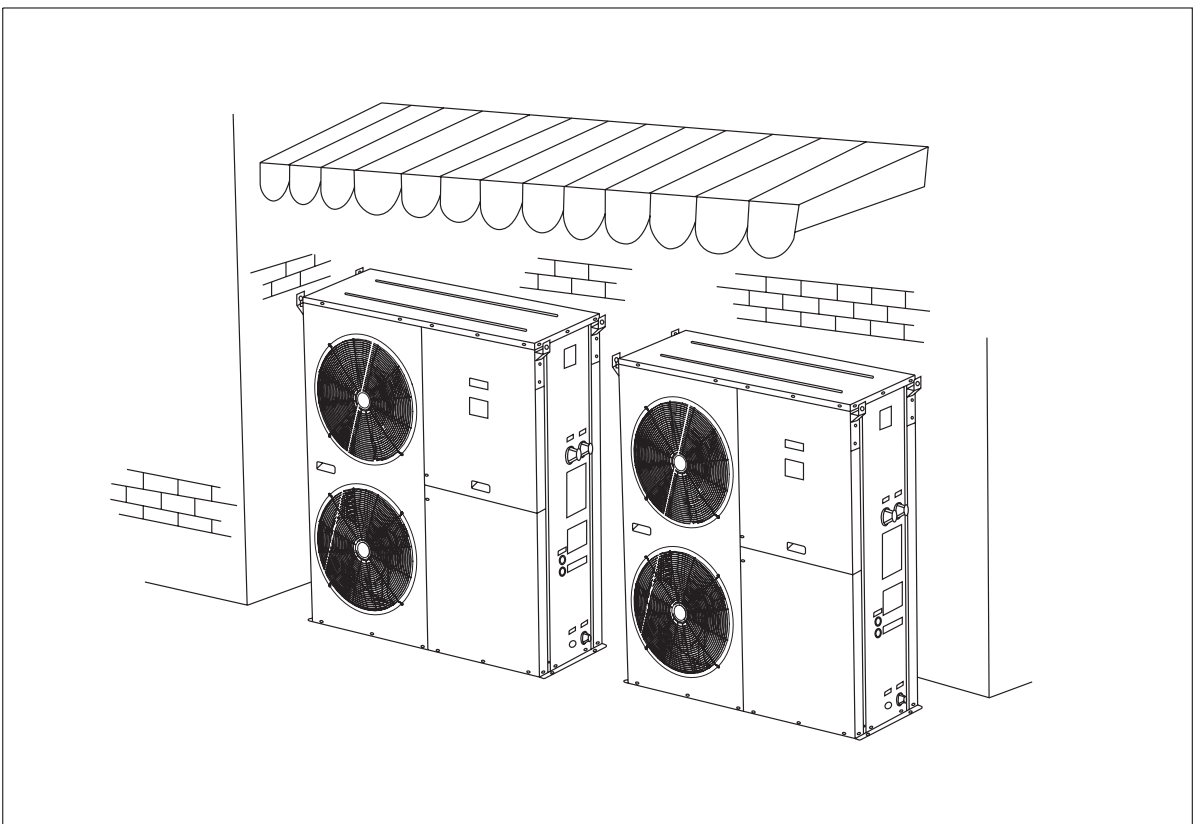
### M5ACV 030/ 055/ 075CR



## M5ACV 030CR

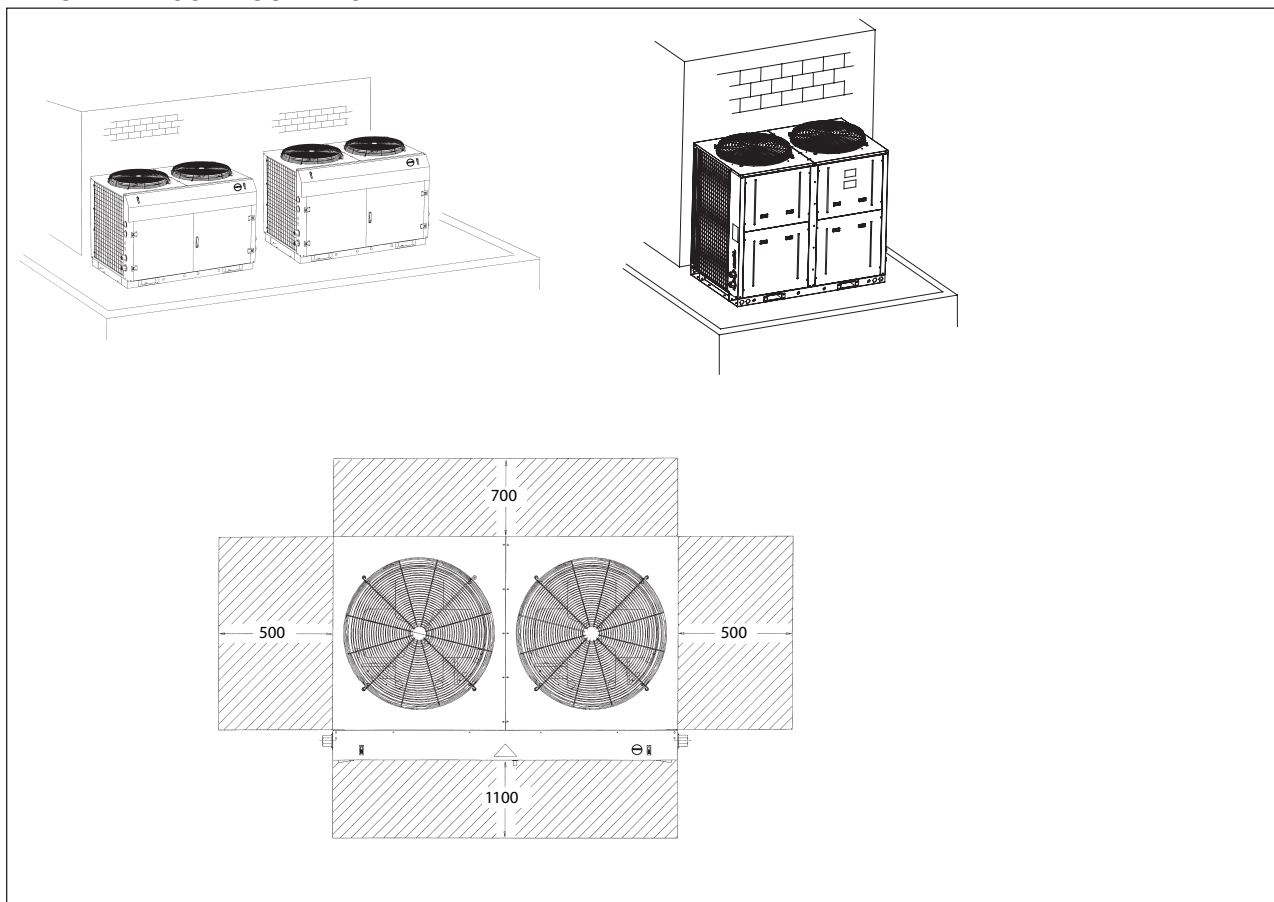


## M5ACV 055CR / 075CR





## M5ACV 100 / 135 / 210CR



### Safety Precautions

Before installing the air conditioner unit, please read the following safety precautions carefully



### Warning

- Installation and maintenance should be performed by qualified persons who are familiar with local code and regulation, and experienced with this type of appliance.
- All field wiring must be installed in accordance with the national wiring regulation.
- Ensure that the rated voltage of the unit corresponds to that of the name plate before commencing wiring work according to the wiring diagram.
- The unit must be GROUNDED to prevent possible hazards due to installation failure.
- All electrical wiring must not touch the refrigerant piping, compressor or any moving parts of the fan motors.
- Confirm that the unit has been switched OFF before installing or servicing the unit.
- Do not touch the compressor or refrigerant piping without wearing gloves.



## Caution

**Please take note of the following important points when installing.**

- **Do not install the unit where leakage of flammable gas may occur.**



If gas leaks and accumulates around the unit, it may cause fire ignition.

- **Ensure that the drainage piping is connected properly.**



If the drainage piping is not connected properly, it may cause water leakage which will dampen the furniture.

- **Do not overcharge the unit.**



This unit is factory pre-charged. Overcharge will cause over-current or damage to the compressor.

- **Ensure that the units panel is closed after service or installation.**



Unsecured panels will cause unit to operate noisily.

## Installation Location

- Installation work should be done by the authorized dealer or qualified contractor. Never install the unit yourself.
- Make sure there is sufficient airflow around the unit.
- Vibration isolator should be provided to reduce the vibration and noise of the unit.
- There should be sufficient space allocated for servicing and maintenance when installing the unit.

## Transportation

- The unit should be lifted using a crane. Ensure that the hanger belts are not touching the coil, top panel and front panel (use protective panel) as shown in Figure 1.
- The bolt of the base and channel support can be removed after putting the unit on the fixed location.

**Figure 1**

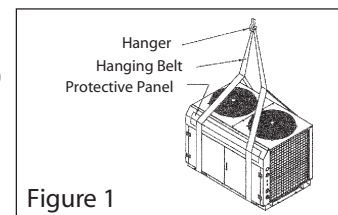


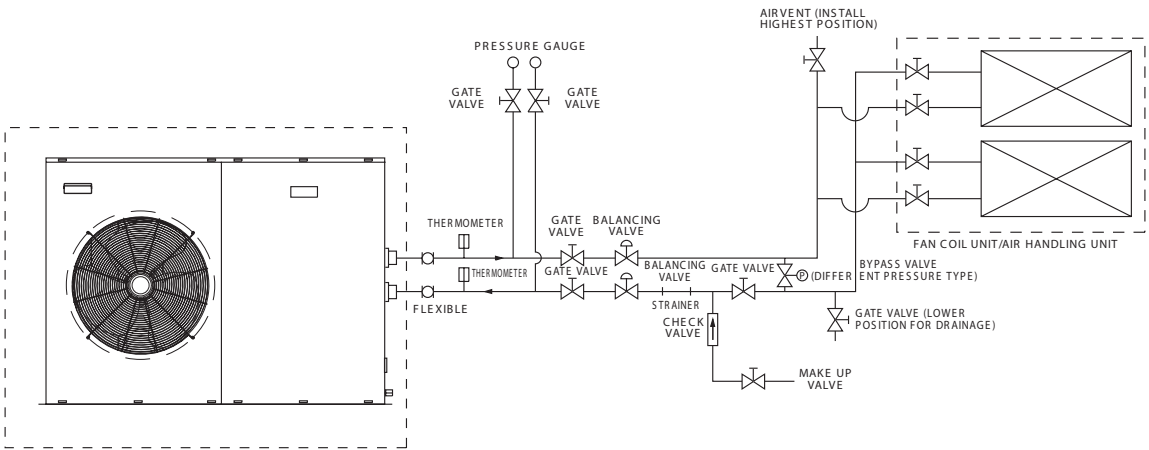
Figure 1

## Water Piping and Fitting

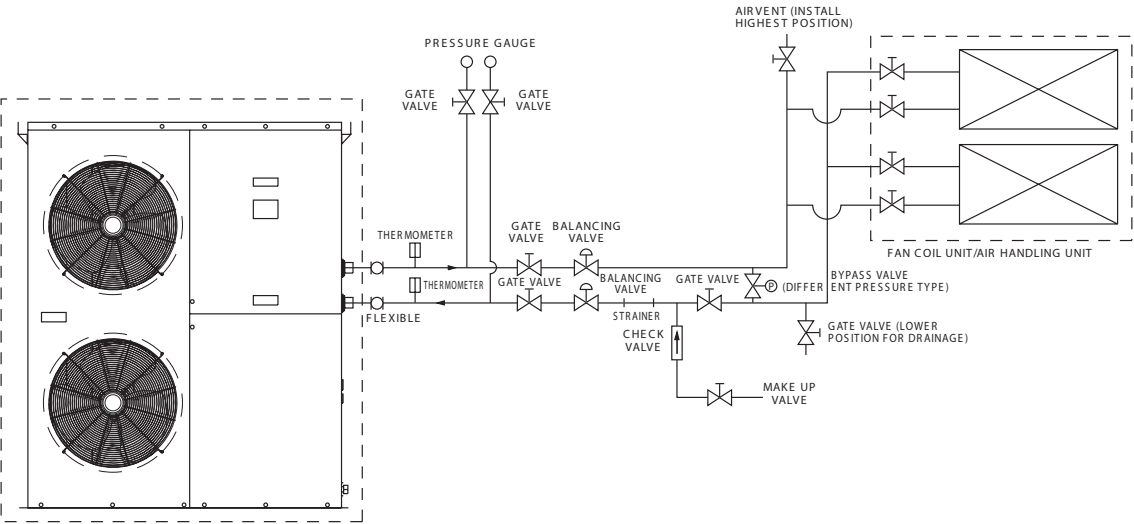
- All water pipe must be insulated to prevent capacity losses and condensation.
- Install a 40-60 mesh strainer to ensure water quality is good.
- Water pipe recommended are black steel pipe and copper pipe.
- During installation, the piping of the unit should be clamp before rotating the installation pipe to reduce the moment induce on the unit piping.
- Users are recommended to install the pipe and accessories as shown in Figure 2.
- An air vent must be installed at the highest position, while a drainage plug at the lowest position of the water circuit. Open the air vent to release any air trap in the water circuit.
- Run the clean water through the water inlet and operate the pump to drain out the dirty water. Clean the strainer after running the pump for 30 minutes.
- Fill up the water circuit after connecting the pipes and equipment. Check water leakage at all connections and joints. Do not start the unit when the system is leaking.
- To optimize the capacity of the system, ensure that the system is free of air bubbles. The air trapped in the system would make the system unbalanced.

M5ACV 030 / 055 / 075CR

M5ACV 030 CR



M5ACV 055CR / 075CR



## M5ACV 100 / 135 / 210CR

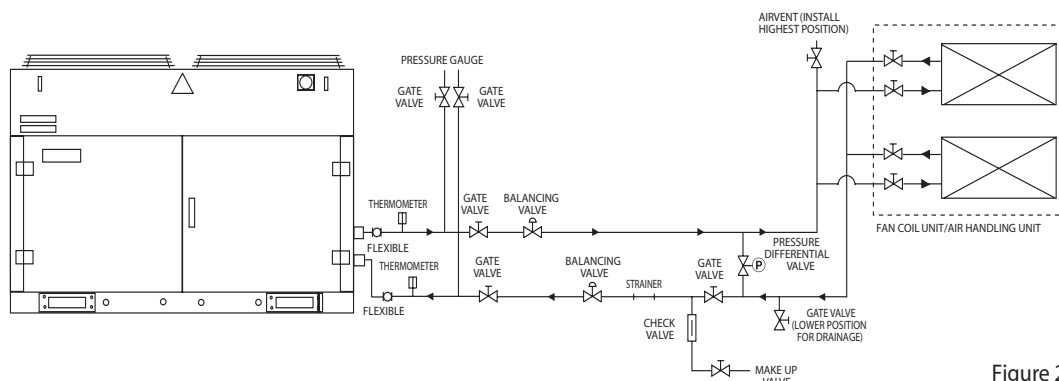


Figure 2



## CAUTION

- Do not allow water to remain in the water pipes if the unit is not operating for a long period. Water must be drained out if the unit is not running during winter. Failing to do so would cause the pipe to crack.
- Do not drink the chilled water in the unit.

## Electrical and Wiring

- Refer to the wiring diagram provided on the unit when making electrical wiring.
- Do not ground any electrical equipment to the water piping.
- Install an external isolator switch (if it is not provided) to prevent electrical shock.

## RECOMMENDED FUSE AND CABLE SIZES

Model		M5ACV030CR	M5ACV055CR	M5ACV075CR
Voltage Range**		230/1/50	415/3/50	415/3/50
Recommended Fuse*	A	36	25	40
Power Supply Cable Size*	mm <sup>2</sup>	10	10	10
Number of Conductor		3	5	5
Interconnection Cable Size*	mm <sup>2</sup>	1.5	1.5	1.5

Model		M5ACV100CR	M5ACV135CR	M5ACV210CR
Voltage Range**		415/3/50	415/3/50	415/3/50
Recommended Fuse*	A	50	60	100
Power Supply Cable Size*	mm <sup>2</sup>	10	16	25
Number of Conductor		5	5	5
Interconnection Cable Size*	mm <sup>2</sup>	1.5	1.5	1.5

**IMPORTANT :**

- \* The figures shown in the table are for information purpose only. They should be checked and selected to comply with the local/national codes of regulations. This is also subjected to the type of installation and conductors used.
- \*\* The appropriate voltage range should be checked with label data on the unit.



## CAUTION

- All field wiring must be installed in accordance with the national wiring regulation.
- All the terminals and connections must be tightened. Improper connection and fastenings could cause electric shock, short circuit and fire.
- Ensure that the rated voltage of the unit corresponds to that of the name plate before commencing wiring work according to the wiring diagram.
- The unit must be GROUNDED to prevent possible hazards due to insulation failure.
- All electrical wiring must not touch the refrigerant piping, compressor, pump, fan motor or any moving parts of the fan motors.
- Do not operate the chiller with wet hands. It would result in electric shock.
- Do not use fuse of different amperage than stated. Using wire etc. to replace a fuse could cause equipment damage or fire.



## WARNING

- All terminals and connection must be tightened.
- Avoid any wires from touching the refrigerant pipe. Apply insulation if necessary.
- Avoid any wires from touching the moving components such as, fan motor, pump & compressor.

## Water Piping System Setup

- Fill up the water circuit after connecting all the pipes and equipment. Perform leak checks for all connections and joints. Do not start the unit when the system is leaking.
- To optimize the capacity of the system, ensure that the system is free of air bubbles. The air trapped in the system would make the system unbalanced.

## Refrigerant Circuit

- All mini chiller units are pre-charged with R410A refrigerant. The only piping that needs to be done is the water piping from mini chiller (outdoor) to the fan coil unit (indoor).

## Safety and Cautions

It is advisable to read through all the safety precautions before installing and commissioning of the unit.

- Contact your dealer for installation, reinstallation or dismantling of unit. Improper handling of unit could result in leaks, electrical shock or unit malfunction.
- Use the controller handset to switch on/off the unit. Do not plug off the main power supply directly, it would cause the unit to breakdown.
- Improper connections and fastening could cause electric shock, short circuit and fire.
- Do not introduce foreign objects such as fingers, sticks etc. into the air inlet and outlet.
- Do not spray any chemical agents or flammable agents to the unit. It would cause fire or explosion.
- Do not climb or place objects on top of the mini chiller.
- Do not operate the chiller with wet hands. It would result in electric shock.
- Do not use fuse of different amperage than stated. Using wire, etc. to replace a fuse could cause equipment damage or fire.
- Provide proper grounding for the mini chiller. Do not connect the ground wire to gas piping, water piping, lighting rods or telephone ground wire. Improper grounding could cause electrical shock.
- Do not attempt to do any service or maintenance when unit is operating.
- Do not change the settings of the safety devices.
- Do not consume the chilled water in the unit.
- Do not allow water to remain in the water pipes if the unit is not operating for a long period. Water must be drained out if the unit is not running during winter. Failing to do so would cause the pipe to crack.
- Do not touch the aluminum fin coil. It would damage the coil or cause injury.

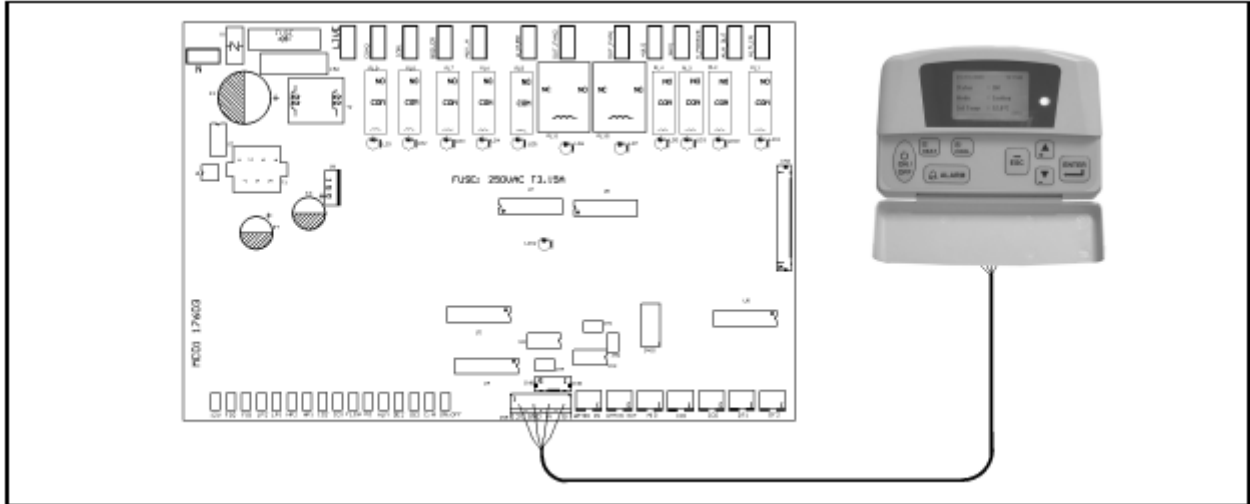


## Caution

- R410A must be charged as liquid. Usually R410A cylinder is equipped with a dip-pipe for liquid withdrawal. If there is no dip-pipe, the cylinder should be inverted so as to withdraw liquid R410A from the valve.
- Do not top-up when servicing leak, as this will reduce the unit performance. Vacuum the unit thoroughly and then charge the unit with fresh R410A according to the amount recommended in the specification.

## Control Operation Guide

The unit is equipped with a microprocessor controller board. The microprocessor controller is provided to give temperature control for the system by accurately measuring and controlling the water entering and water leaving temperature. The temperature setting in the unit is preset in the factory. It is not recommended to change the setting unless necessary. A wired controller handset is connected to the microprocessor board. Every parameter setting and reading can be observed from the LCD of the handset.



1. Handset location

The handset is located on a metal bracket behind the right door panel.

2. LED Display (microprocessor board)

The keypad LED will light up when the unit is turned on.

3. LCD display (controller handset)

During normal operations, the LCD can display the entering water temperature, the leaving water temperature, the entering water set point temperature, compressor on or off status and outdoor air temperature. When malfunctioning occurred, the LCD would blink. The display would show the faulty parameter and the date and time of the occurrence.

4. Controller functioning specification

There is a 3 minute delay for the compressor and fan motor to restart (default setting). During defrosting, fan motor is not running.

# Sound Data

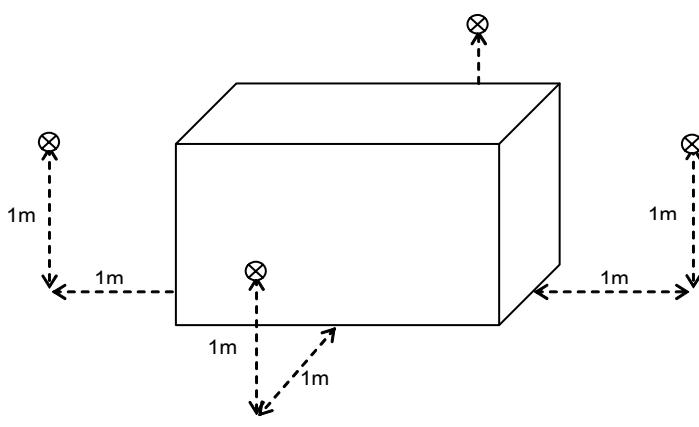
## Sound Pressure Level

Model	1/1 Octave Sound Pressure Level (dB, ref 20μPa)							Overall (dBA)
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
M5ACV030CR	56	60	59	53	48	43	38	59
M5ACV055CR	60	63	61	56	52	46	42	62
M5ACV075CR	65	65	63	61	57	51	42	65
M5ACV100CR	61	58	57	58	56	53	53	63
M5ACV135CR	66	58	58	62	60	58	52	67
M5ACV210CR	68	68	62	61	59	56	55	67

Microphone position : 1m from each side

## Sound Power Level

Model	1/1 Octave Sound Power Level (dB, ref 1pW)							Overall (dBA)
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
M5ACV030CR	67	74	69	64	59	56	48	71
M5ACV055CR	71	73	71	66	63	56	55	72
M5ACV075CR	77	75	74	71	67	61	53	76
M5ACV100CR	76	75	72	72	71	67	68	78
M5ACV135CR	80	73	74	76	75	71	66	81
M5ACV210CR	79	81	73	72	69	66	65	78

Model	Measuring location (for Sound Pressure Level)
M5ACV030CR M5ACV055CR M5ACV075CR M5ACV100CR M5ACV135CR M5ACV210CR	 <p>Microphone position : 1m from each side</p>

# Selection Process

## Water Pressure Drop VS Flow Rate

### Model : M5ACV030CR - Cooling

Water Flow m <sup>3</sup> /hr	Pump Head kPa	System Head kPa	Available Head Pressure kPa
1.26	109.00	26.56	82.44
1.30	108.40	26.59	81.81
1.32	108.20	28.94	79.26
1.36	108.00	31.54	76.46
1.39	107.20	31.39	75.81
1.43	106.00	31.81	74.19
1.49	105.00	32.30	72.70

### Model : M5ACV 030CR - Heating

Water Flow m <sup>3</sup> /hr	Pump Head kPa	System Head kPa	Available Head Pressure kPa
1.89	95.00	38.34	56.66
1.80	96.60	35.40	61.20
1.66	101.00	32.45	68.55
1.44	106.00	28.64	77.36
1.12	111.80	18.51	93.29

### Model : M5ACV055CR - Cooling

Water Flow m <sup>3</sup> /hr	Pump Head kPa	System Head kPa	Available Head Pressure kPa
1.58	240.00	69.64	170.36
1.97	222.64	67.41	155.23
2.28	207.55	67.18	140.37
2.52	194.34	66.91	127.43
2.68	185.28	67.64	117.64
2.78	180.00	68.11	111.89
2.80	176.98	66.33	110.65

### Model : M5ACV055CR - Heating

Water Flow m <sup>3</sup> /hr	Pump Head kPa	System Head kPa	Available Head Pressure kPa
2.82	175.47	66.10	109.37
2.79	179.25	68.52	110.73
2.73	182.26	67.30	114.96
2.44	200.00	67.98	132.02
1.89	226.42	67.92	158.50



**Model : M5ACV075CR - Cooling / Heating**

Water Flow m <sup>3</sup> /hr	Pump Head kPa	System Head kPa	Available Head Pressure kPa
2.20	315.00	21.78	293.22
2.60	300.00	31.81	268.19
3.00	285.00	41.17	243.83
3.40	275.00	52.17	222.83
3.80	265.00	65.60	199.40

**Model : M5ACV100CR - Cooling**

Water Flow m <sup>3</sup> /hr	Pump Head kPa	System Head kPa	Available Head Pressure kPa
3.98	260.00	42.46	217.54
4.25	250.00	46.67	203.33
4.40	240.00	45.10	194.90
4.79	235.00	62.30	172.70
4.83	230.00	59.54	170.46
4.86	227.50	59.30	168.20
4.90	225.00	59.07	165.93

**Model : M5ACV100CR - Heating**

Water Flow m <sup>3</sup> /hr	Pump Head kPa	System Head kPa	Available Head Pressure kPa
6.31	175.00	104.87	70.13
5.90	183.00	82.71	100.29
5.04	225.00	67.72	157.28
4.64	238.55	57.02	181.53
4.24	251.00	47.32	203.68

**Model : M5ACV135CR - Cooling**

Water Flow m <sup>3</sup> /hr	Pump Head kPa	System Head kPa	Available Head Pressure kPa
5.51	254.55	51.25	203.30
5.89	249.09	57.61	191.48
6.10	244.73	60.38	184.35
6.63	236.36	71.16	165.20
6.68	235.40	72.16	163.24
6.73	234.55	73.29	161.26
6.78	232.73	73.47	159.26

**Model : M5ACV135CR - Heating**

Water Flow m <sup>3</sup> /hr	Pump Head kPa	System Head kPa	Available Head Pressure kPa
8.22	204.82	107.54	97.28
7.65	214.55	91.34	123.21
7.13	226.64	81.24	145.40
6.56	239.55	71.89	167.66
6.01	248.27	60.81	187.46

**Model : M5ACV210CR - Cooling / Heating**

Water Flow m <sup>3</sup> /hr	Pump Head kPa	System Head kPa	Available Head Pressure kPa
7.68	280.00	9.63	270.37
8.64	270.00	14.15	255.85
9.60	255.00	19.44	235.56
10.56	245.00	25.52	219.48
11.25	225.00	30.36	194.64

## Correction Factors with GLYCOL Use

LWT/ deg C	CAPACITY FACTOR			
	GLYCOL			
	10	20	30	40
-5		0.89	0.87	0.77
-3.9		0.9	0.876	0.781
-1.1	0.925	0.925	0.892	0.796
1.7	0.945	0.938	0.906	0.809
4.4	0.956	0.949	0.918	0.82
7.2	0.965	0.958	0.927	0.829
10	0.962	0.957	0.926	0.828

GLYCOL %	WATER FLOW	PRESSURE DROP
10	1.015	1.06
20	1.04	1.12
30	1.08	1.18
40	1.135	1.24

# Engineering and Physical Data

## General Data - Heat pump R410A Inverter

MODEL			M5ACV030CR	M5ACV055CR
NOMINAL COOLING CAPACITY		Btu/h	27000	50000
		W	7913	14654
NOMINAL HEATING CAPACITY		Btu/h	33000	55000
		W	9663	16119
NOMINAL TOTAL INPUT POWER	COOLING	W	5370	7350
	HEATING	W	4510	5850
NOMINAL RUNNING CURRENT	COOLING	A	266.0	15.8
	HEATING	A	21.5	13.7
POWER SOURCE		V/Ph/Hz	220-240 / 1 / 50	380-415 / 3 / 50
REFRIGERANT TYPE			R410A	
CONTROL			ELECTRONIC EXPANSION VALVE	
UNIT DIMENSION	HEIGHT	mm/in	790 / 31.1	1410 / 55.5
	WIDTH	mm/in	1010 / 39.8	1010 / 39.8
	DEPTH	mm/in	460 / 18.1	460 / 18.1
PACKING DIMENSION	HEIGHT	mm/in	920 / 36.2	1551 / 61.1
	WIDTH	mm/in	1204 / 47.4	1204 / 47.4
	DEPTH	mm/in	570 / 22.4	570 / 22.4
UNIT WEIGHT		kg/lb	128 / 282	195 / 430
SOUND PRESSURE LEVEL		dBA	59	62
EVAPORATOR				
NOMINAL WATER FLOW	COOLING	l/s / m³/hr	0.38 ( 1.4 )	0.7 ( 2.5 )
	HEATING	l/s / m³/hr	0.46 ( 1.7 )	0.73 ( 2.6 )
CONDENSER FAN				
TYPE/DRIVE			PROPELLER / DIRECT	
QUANTITY			1	2
HYDRAULIC KIT				
PUMP	TYPE		HORIZONTAL MULTISTAGE END-SUCTION	
	MAX. WATER OPER. PRESSURE		kPa / psi	
			1000 / 145	
	WATER FLOW RATE	COOLING	l/s / m³/hr	0.38 ( 1.4 )
HEATING		l/s / m³/hr	0.46 ( 1.7 )	0.73 ( 2.6 )
PIPING	INSTALLATION PIPE CONNECITON		mm/in	
			25.4 / 1	
	HEAD	COOLING	m	7.7
HEATING		m	7.1	12.2
TANK	MATERIAL		NOT APPLICABLE	
	CAPACITY/VOLUME		L / ft³	
NOT APPLICABLE				
COMPRESSOR				
TYPE			SCROLL	SCROLL
STAGE OF CAPACITY CONTROL (Btu/h)			0 - 28700	0 - 55000
REFRIGERANT				
CHARGING MASS		kg/lb	2.1	4.1

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3) NOMINAL COOLING AND HEATING CAPACITY ARE BASED ON THE CONDITIONS BELOW :

a) COOLING - 12°C / 7°C ENTERING / LEAVING EVAPORATOR WATER TEMPERATURE, 35°C AIR AMBIENT TEMPERATURE.

b) HEATING - 40°C / 45°C ENTERING / LEAVING EVAPORATOR WATER TEMPERATURE, 7°C AIR AMBIENT TEMPERATURE.

4) SOUND PRESSURE LEVEL ARE ACCORDING TO JIS B 8615 STANDARD. POSITION OF THE MEASUREMENT POINT IS 1m IN FRONT AND 1m BELOW THE UNIT.

## General Data - Heat pump R410A Inverter

MODEL			M5ACV075CR
NOMINAL COOLING CAPACITY		Btu/h	70000
		W	20515
NOMINAL HEATING CAPACITY		Btu/h	75000
		W	21980
NOMINAL TOTAL INPUT POWER	COOLING	W	9050
	HEATING	W	7900
NOMINAL RUNNING CURRENT	COOLING	A	16.6
	HEATING	A	15.4
POWER SOURCE		V/Ph/Hz	380-415 / 3 / 50
REFRIGERANT TYPE			R410A
CONTROL			ELECTRONIC EXPANSION VALVE
UNIT DIMENSION	HEIGHT	mm/in	1460 / 57.5
	WIDTH	mm/in	1150 / 45.3
	DEPTH	mm/in	550 / 21.7
PACKING DIMENSION	HEIGHT	mm/in	1626 / 64.0
	WIDTH	mm/in	1309 / 51.5
	DEPTH	mm/in	656 / 25.8
UNIT WEIGHT		kg/lb	200 / 440
SOUND PRESSURE LEVEL		dBA	65
EVAPORATOR			
NOMINAL WATER FLOW	COOLING	l/s / m³/hr	0.95 ( 3.4 )
	HEATING	l/s / m³/hr	1.03 ( 3.7 )
CONDENSER FAN			
TYPE/DRIVE			PROPELLER / DIRECT
QUANTITY			2
HYDRAULIC KIT			
PUMP	TYPE		HORIZONTAL MULTISTAGE END-SUCTION
	MAX. WATER OPER. PRESSURE		kPa / psi
	WATER FLOW RATE	COOLING	l/s / m³/hr
		HEATING	l/s / m³/hr
PIPING	INSTALLATION PIPE CONNECITON		mm/in
	HEAD	COOLING	m
		HEATING	m
		MATERIAL	
TANK	CAPACITY/VOLUME		NOT APPLICABLE
	COMPRESSOR		
TYPE			SCROLL
STAGE OF CAPACITY CONTROL (Btu/h)			0 - 75000
REFRIGERANT			
CHARGING MASS		kg/lb	4.8

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a) COOLING - 12°C / 7°C ENTERING / LEAVING EVAPORATOR WATER TEMPERATURE, 35°C AIR AMBIENT TEMPERATURE.

b) HEATING - 40°C / 45°C ENTERING / LEAVING EVAPORATOR WATER TEMPERATURE, 7°C AIR AMBIENT TEMPERATURE.

4) SOUND PRESSURE LEVEL ARE ACCORDING TO JIS B 8615 STANDARD. POSITION OF THE MEASUREMENT POINT IS 1m IN FRONT AND 1m BELOW THE UNIT.

## General Data - Heat pump R410A Inverter

MODEL			M5ACV100CR	M5ACV135CR	
NOMINAL COOLING CAPACITY		Btu/h	95000	131500	
		W	27840	38540	
NOMINAL HEATING CAPACITY		Btu/h	100000	141500	
		W	29310	41470	
NOMINAL TOTAL INPUT POWER	COOLING	W	12000	15750	
	HEATING	W	11400	16250	
NOMINAL RUNNING CURRENT	COOLING	A	24.4	30.0	
	HEATING	A	23.8	31.1	
POWER SOURCE		V/Ph/Hz	380-415 / 3 / 50		
REFRIGERANT TYPE			R410A		
CONTROL			ELECTRONIC EXPANSION VALVE / CAPILLARY TUBE		
UNIT DIMENSION	HEIGHT	mm/in	1245 / 49.0	1245 / 49.0	
	WIDTH	mm/in	1500 / 59.1	1800 / 70.9	
	DEPTH	mm/in	900 / 35.4	1150 / 45.3	
PACKING DIMENSION	HEIGHT	mm/in	1452 / 57.2	1452 / 57.2	
	WIDTH	mm/in	1732 / 68.2	2032 / 80.0	
	DEPTH	mm/in	1032 / 40.6	1282 / 50.5	
UNIT WEIGHT		kg/lb	405 / 893	525 / 1157	
SOUND PRESSURE LEVEL		dBA	63	67	
EVAPORATOR					
NOMINAL WATER FLOW	COOLING	l/s / m³/hr	1.33 ( 4.8 )	1.84 ( 6.6 )	
	HEATING	l/s / m³/hr	1.40 ( 5.0 )	1.98 ( 7.1 )	
CONDENSER FAN					
TYPE/DRIVE			PROPELLER / DIRECT		
QUANTITY			2	2	
HYDRAULIC KIT					
PUMP	TYPE		HORIZONTAL MULTISTAGE END-SUCTION		
	MAX. WATER OPER. PRESSURE		kPa / psi	1000 / 145	
	WATER FLOW RATE	COOLING	l/s / m³/hr	1.33 ( 4.8 )	1.84 ( 6.6 )
		HEATING	l/s / m³/hr	1.40 ( 5.0 )	1.98 ( 7.1 )
PIPING	INSTALLATION PIPE CONNECITON		mm/in	31.75 / 1 1/4	
	HEAD	COOLING	m	17.6	16.8
		HEATING	m	16.0	14.8
TANK	MATERIAL		NOT APPLICABLE		
	CAPACITY/VOLUME		L / ft³	NOT APPLICABLE	
COMPRESSOR					
TYPE			SCROLL	SCROLL	
STAGE OF CAPACITY CONTROL (Btu/h)			73000 - 122000	99000 - 149000	
REFRIGERANT					
CHARGING MASS		kg/lb	4.7 x2 / 10.4 x2	6.0 x2 / 13.2 x2	

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3) NOMINAL COOLING AND HEATING CAPACITY ARE BASED ON THE CONDITIONS BELOW :

a) COOLING - 12°C / 7°C ENTERING / LEAVING EVAPORATOR WATER TEMPERATURE, 35°C AIR AMBIENT TEMPERATURE.

b) HEATING - 40°C / 45°C ENTERING / LEAVING EVAPORATOR WATER TEMPERATURE, 7°C AIR AMBIENT TEMPERATURE.

4) SOUND PRESSURE LEVEL ARE ACCORDING TO JIS B 8615 STANDARD. POSITION OF THE MEASUREMENT POINT IS 1m IN FRONT AND 1m BELOW THE UNIT.

## General Data - Heat pump R410A Inverter

MODEL			M5ACV210CR
NOMINAL COOLING CAPACITY		Btu/h	200000
		W	58620
NOMINAL HEATING CAPACITY		Btu/h	210000
		W	61550
NOMINAL TOTAL INPUT POWER	COOLING	W	22300
	HEATING	W	21800
NOMINAL RUNNING CURRENT	COOLING	A	44.6
	HEATING	A	44.6
POWER SOURCE		V/Ph/Hz	380-415 / 3 / 50
REFRIGERANT TYPE			R410A
CONTROL			ELECTRONIC EXPANSION VALVE
UNIT DIMENSION	HEIGHT	mm/in	1786 / 70.3
	WIDTH	mm/in	2093 / 82.4
	DEPTH	mm/in	1192 / 46.9
PACKING DIMENSION	HEIGHT	mm/in	1975 / 77.7
	WIDTH	mm/in	2176 / 85.6
	DEPTH	mm/in	1242 / 48.9
UNIT WEIGHT		kg/lb	682 / 1504
SOUND PRESSURE LEVEL		dBA	67
EVAPORATOR			
NOMINAL WATER FLOW	COOLING	l/s / m³/hr	2.66 ( 9.6 )
	HEATING	l/s / m³/hr	2.86 ( 10.3 )
CONDENSER FAN			
TYPE/DRIVE			PROPELLER / DIRECT
QUANTITY			2
HYDRAULIC KIT			
PUMP	TYPE		HORIZONTAL MULTISTAGE END-SUCTION
	MAX. WATER OPER. PRESSURE		kPa / psi
			1000 / 145
	WATER FLOW RATE	COOLING	l/s / m³/hr
HEATING		l/s / m³/hr	2.86 ( 10.3 )
PIPING	INSTALLATION PIPE CONNECITON		mm/in
			38 / 1 1/2
	HEAD	COOLING	m
HEATING		m	20.0
TANK	MATERIAL		NOT APPLICABLE
	CAPACITY/VOLUME		L / ft³
COMPRESSOR			
TYPE			SCROLL
STAGE OF CAPACITY CONTROL (Btu/h)			0 - 210000
REFRIGERANT			
CHARGING MASS	COOLING	kg/lb	9.5 / 20.9
	HEATING	kg/lb	8.5 / 18.7

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a) COOLING - 12°C / 7°C ENTERING / LEAVING EVAPORATOR WATER TEMPERATURE, 35°C AIR AMBIENT TEMPERATURE.

b) HEATING - 40°C / 45°C ENTERING / LEAVING EVAPORATOR WATER TEMPERATURE, 7°C AIR AMBIENT TEMPERATURE.

4) POSITION OF THE MEASUREMENT POINT IS 1m IN FRONT AND 1m BELOW THE UNIT.

## Components Data

MODEL				M5ACV030CR		M5ACV055CR	
CONDENSER FAN	TYPE			PROPELLER			
	Q'TY			1		2	
	MATERIAL			METAL			
	DRIVE			DIRECT			
	DIAMETER		mm/in	457.2 / 18			
CONDENSER FAN MOTOR	TYPE			INDUCTION			
	Q'TY			1		2	
	INDEX OF PROTECTION (IP)			NA		NA	
COMPRESSOR	TYPE			AC INVERTER SCROLL			
	OIL TYPE			POE		POE	
	OIL AMOUNT	INVERTER SCROLL	cm <sup>3</sup> / fl.oz.	1700 / 57.5		2300 / 77.8	
CONDENSER COIL	TYPE			CROSS FINNED TUBES			
	TUBE	MATERIAL		INNER GROOVED COPPER			
		DIAMETER	mm/in	9.52 / 3/8			
		THICKNESS	mm/in	0.372 / 0.015			
	FIN	MATERIAL		CORRUGATED ALUMINIUM			
		THICKNESS	mm/in	0.12 / 0.005			
		FACE AREA	m <sup>2</sup> / ft <sup>2</sup>	0.65 / 7.0		1.17 / 12.6	
		ROW		2			
		FIN PER INCH		16			
BPHE	TYPE			BRAZED PLATE HEAT EXCHANGER			
	MATERIAL			STAINLESS STEEL			
PUMP	TYPE			HORIZONTAL MULTISTAGE END-SUCTION			
	MATERIAL			CAST IRON & STAINLESS STEEL			
CASING	MATERIAL			ELECTRO-GALVANIZED MILD STEEL			
	COLOUR			LIGHT GREY- PE775104			

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MODEL				M5ACV075CR	
CONDENSER FAN	TYPE			PROPELLER	
	Q'TY			2	
	MATERIAL			METAL	
	DRIVE			DIRECT	
	DIAMETER	mm/in		609.6 / 24	
CONDENSER FAN MOTOR	TYPE			INDUCTION	
	Q'TY			2	
	INDEX OF PROTECTION (IP)			NA	
COMPRESSOR	TYPE			AC INVERTER SCROLL	
	OIL TYPE			POE	
	OIL AMOUNT	INVERTER SCROLL	cm <sup>3</sup> / fl.oz.	2300 / 77.8	
CONDENSER COIL	TYPE			CROSS FINNED TUBES	
	TUBE	MATERIAL		INNER GROOVED COPPER	
		DIAMETER	mm/in	9.52 / 3/8	
		THICKNESS	mm/in	0.372 / 0.015	
	FIN	MATERIAL		CORRUGATED ALUMINIUM	
		THICKNESS	mm/in	0.12 / 0.005	
		FACE AREA	m <sup>2</sup> / ft <sup>2</sup>	1.27 / 13.7	
		ROW		2	
		FIN PER INCH		16	
	BPHE	TYPE			BRAZED PLATE HEAT EXCHANGER
MATERIAL			STAINLESS STEEL		
PUMP	TYPE			HORIZONTAL MULTISTAGE END-SUCTION	
	MATERIAL			CAST IRON & STAINLESS STEEL	
CASING	MATERIAL			ELECTRO-GALVANIZED MILD STEEL	
	COLOUR			LIGHT GREY- PE775104	

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## Components Data

MODEL				M5ACV100CR		M5ACV135CR	
CONDENSER FAN	TYPE			PROPELLER			
	Q'TY			2			
	MATERIAL			METAL			
	DRIVE			DIRECT			
	DIAMETER		mm/in	600 / 24		660 / 26	
CONDENSER FAN MOTOR	TYPE			INDUCTION			
	Q'TY			2			
	INDEX OF PROTECTION (IP)			IP44		IP44	
COMPRESSOR 1	TYPE			AC INVERTER SCROLL		AC INVERTER SCROLL	
	OIL TYPE			ME56			
	OIL AMOUNT		cm <sup>3</sup> / fl.oz.	2300 / 77.8		2300 / 77.8	
COMPRESSOR 2	TYPE			SCROLL			
	OIL TYPE			POE			
	OIL AMOUNT		cm <sup>3</sup> / fl.oz.	1952 / 66.0		-	
CONDENSER COIL	TYPE			CROSS FINNED TUBES			
	TUBE	MATERIAL		INNER GROOVED COPPER			
		DIAMETER	mm/in	9.52 / 3/8			
		THICKNESS	mm/in	0.28 / 0.011			
	FIN	MATERIAL		CORRUGATED ALUMINIUM			
		THICKNESS	mm/in	0.11 / 0.004			
		FACE AREA	m <sup>2</sup> / ft <sup>2</sup>	1.39 / 14.9		2.08 / 22.4	
		ROW		2			
		FIN PER INCH		14			
BPHE	TYPE			BRAZED PLATE HEAT EXCHANGER			
	MATERIAL			STAINLESS STEEL			
PUMP	TYPE			HORIZONTAL MULTISTAGE END-SUCTION			
	MATERIAL			CAST IRON & STAINLESS STEEL			
CASING	MATERIAL			ELECTRO-GALVANIZED MILD STEEL			
	COLOUR			LIGHT GREY- PE775104			

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## Components Data

MODEL				M5ACV210CR	
CONDENSER FAN	TYPE			PROPELLER	
	Q'TY			2	
	MATERIAL			METAL	
	DRIVE			DIRECT	
	DIAMETER	mm/in		812 / 32	
CONDENSER FAN MOTOR	TYPE			INDUCTION	
	Q'TY			2	
	INDEX OF PROTECTION (IP)			NA	
COMPRESSOR 1	TYPE			AC INVERTER SCROLL	
	OIL TYPE			ME56	
	OIL AMOUNT	cm <sup>3</sup> / fl.oz.		2300 / 77.8	
COMPRESSOR 2	TYPE			SCROLL	
	OIL TYPE			ME56	
	OIL AMOUNT	cm <sup>3</sup> / fl.oz.		1700 / 57.5	
COMPRESSOR 3	TYPE			SCROLL	
	OIL TYPE			POE	
	OIL AMOUNT	cm <sup>3</sup> / fl.oz.		3257 / 110.2	
CONDENSER COIL	TYPE			CROSS FINNED TUBES	
	TUBE	MATERIAL		INNER GROOVED COPPER	
		DIAMETER	mm/in		9.52 / 3/8
		THICKNESS	mm/in		0.28 / 0.011
	FIN	MATERIAL		CORRUGATED ALUMINIUM	
		THICKNESS	mm/in		0.11 / 0.004
		FACE AREA	m <sup>2</sup> / ft <sup>2</sup>		3.07 / 33.0
		ROW		2	
		FIN PER INCH		16	
BPHE	TYPE			BRAZED PLATE HEAT EXCHANGER	
	MATERIAL			STAINLESS STEEL	
PUMP	TYPE			HORIZONTAL MULTISTAGE END-SUCTION	
	MATERIAL			CAST IRON & STAINLESS STEEL	
CASING	MATERIAL			ELECTRO-GALVANIZED MILD STEEL	
	COLOUR			LIGHT GREY- PE775104	

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## Safety Devies

MODEL				M5ACV030CR	M5ACV055CR
SAFETY DEVICE	HIGH PRESSURE SWITCH	TYPE		NC	NC
		OPEN	Pa / psi	4140 / 600	4140 / 600
		CLOSE	Pa / psi	3312 / 480	3312 / 480
	LOW PRESSURE SWITCH	TYPE		NC	NC
		OPEN	Pa / psi	124 / 18	124 / 18
		CLOSE	Pa / psi	193 / 28	193 / 28
	PHASE PROTECTION			BUILT IN ON BOARD	BUILT IN ON BOARD
	DIFFERENTIAL PRESSURE SWITCH			YES	YES
	ANTI-FREEZE PROTECTION SENSOR			YES	YES
	DISCH. THERMOSTAT SETTING		°C / °F	110 / 230	110 / 230
	OVER PRESSURE RELIEF VALVE			YES	YES
	ANTI-FREEZE HEATER ON BPHE			YES	YES
	PUMP OLP			YES	YES
	COMPRESSOR OLP			YES	YES

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MODEL				M5ACV075CR	
SAFETY DEVICE	HIGH PRESSURE SWITCH	TYPE		NC	
		OPEN	Pa / psi	4140 / 600	
		CLOSE	Pa / psi	3312 / 480	
	LOW PRESSURE SWITCH	TYPE		NC	
		OPEN	Pa / psi	124 / 18	
		CLOSE	Pa / psi	193 / 28	
	PHASE PROTECTION			BUILT IN ON BOARD	
	DIFFERENTIAL PRESSURE SWITCH			YES	
	ANTI-FREEZE PROTECTION SENSOR			YES	
	DISCH. THERMOSTAT SETTING		°C / °F	110 / 230	
	OVER PRESSURE RELIEF VALVE			YES	
	ANTI-FREEZE HEATER ON BPHE			YES	
	PUMP OLP			YES	
	COMPRESSOR OLP			YES	

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MODEL				M5ACV100CR	M5ACV135CR
SAFETY DEVICE	HIGH PRESSURE SWITCH	TYPE		NC	NC
		OPEN	Pa / psi	4140 / 600	4140 / 600
		CLOSE	Pa / psi	3312 / 480	3312 / 480
	LOW PRESSURE SWITCH	TYPE		NC	NC
		OPEN	Pa / psi	124 / 18	124 / 18
		CLOSE	Pa / psi	193 / 28	193 / 28
	PHASE PROTECTION			BUILT IN ON BOARD	
	DIFFERENTIAL PRESSURE SWITCH			YES	YES
	ANTI-FREEZE PROTECTION SENSOR			YES	YES
	DISCH. THERMOSTAT SETTING		°C / °F	110 / 230	110 / 230
	OVER PRESSURE RELIEF VALVE			YES	YES
	ANTI-FREEZE HEATER ON BPHE			YES	YES
	PUMP OLP			YES	YES
	COMPRESSOR OLP			YES	YES

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MODEL				M5ACV210CR	
SAFETY DEVICE	HIGH PRESSURE SWITCH	TYPE		NC	
		OPEN	Pa / psi	4140 / 600	
		CLOSE	Pa / psi	3312 / 480	
	LOW PRESSURE SWITCH	TYPE		NC	
		OPEN	Pa / psi	124 / 18	
		CLOSE	Pa / psi	193 / 28	
	PHASE PROTECTION			BUILT IN ON BOARD	
	DIFFERENTIAL PRESSURE SWITCH			YES	
	ANTI-FREEZE PROTECTION SENSOR			YES	
	DISCH. THERMOSTAT SETTING		°C / °F	110 / 230	
	OVER PRESSURE RELIEF VALVE			YES	
	ANTI-FREEZE HEATER ON BPHE			YES	
	PUMP OLP			YES	
	COMPRESSOR OLP			YES	

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# Performance Data

## Model : M5ACV 030CR / 055CR - Cooling

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)												WATER FLOW RATE  m³/hr	AVAIL. HEAD PRESS.  kPa	PUMP INPUT POWER  W	PUMP INPUT AMP  A
		19			20			25			28						
		COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A	kW	kW	A				
M5ACV030CR	4	9.79	3.81	14.1	9.69	3.97	14.7	9.13	4.62	17.1	8.69	4.90	18.1	1.26	82	194	0.9
	5	10.03	3.84	14.2	9.94	4.01	14.8	9.36	4.67	17.2	8.91	4.95	18.3	1.30	82	196	0.9
	6	10.27	3.89	14.4	10.17	4.04	14.9	9.56	4.71	17.4	9.09	4.99	18.4	1.32	79	197	0.9
	7	10.47	3.91	14.4	10.38	4.08	15.1	9.78	4.76	17.6	9.32	5.05	18.7	1.36	76	199	0.9
	8	10.96	3.97	14.7	10.84	4.14	15.3	10.14	4.81	17.8	9.61	5.09	18.8	1.39	76	201	0.9
	9	11.29	4.01	14.8	11.21	4.18	15.4	10.38	4.86	17.9	9.82	5.14	19.0	1.43	74	203	0.9
	10	11.86	4.07	15.0	11.73	4.23	15.6	10.93	4.90	18.1	10.34	5.18	19.1	1.49	73	206	0.9
M5ACV055CR	4	13.09	4.06	8.6	12.76	4.31	9.1	11.30	5.11	10.8	10.56	5.59	11.9	1.58	170	211	0.9
	5	15.04	4.18	8.9	14.80	4.43	9.4	13.62	5.24	11.1	12.95	5.72	12.1	1.97	155	231	1.0
	6	16.36	4.29	9.1	16.21	4.54	9.6	15.37	5.35	11.3	14.80	5.83	12.4	2.28	140	248	1.1
	7	17.99	4.42	9.4	17.85	4.68	9.9	17.01	5.49	11.7	16.40	5.98	12.7	2.52	127	260	1.1
	8	18.99	4.50	9.6	18.87	4.76	10.1	18.09	5.56	11.8	17.47	6.05	12.8	2.69	118	269	1.2
	9	20.31	4.61	9.8	20.12	4.86	10.3	19.05	5.67	12.0	18.28	6.16	13.1	2.78	112	274	1.2
	10	20.99	4.71	10.0	20.75	4.96	10.5	19.44	5.76	12.2	18.56	6.25	13.3	2.80	111	275	1.2

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)												WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		30			32			35			40						
		COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A	kW	kW	A				
M5ACV030CR	4	8.35	5.03	18.6	7.98	5.14	19.0	7.35	5.22	25.9	6.14	5.27	19.5	1.26	82	194	0.9
	5	8.56	5.09	18.8	8.17	5.19	19.2	7.53	5.27	26.1	6.29	5.31	19.6	1.30	82	196	0.9
	6	8.73	5.13	19.0	8.34	5.23	19.3	7.69	5.31	26.3	6.42	5.34	19.8	1.32	79	197	0.9
	7	8.96	5.20	19.2	8.56	5.30	19.6	7.91	5.37	26.6	6.60	5.39	19.9	1.36	76	199	0.9
	8	9.22	5.23	19.3	8.79	5.32	19.7	8.09	5.39	26.7	6.75	5.42	20.0	1.39	76	201	0.9
	9	9.45	5.27	19.5	8.97	5.37	19.8	8.33	5.43	26.9	6.98	5.45	20.1	1.43	74	203	0.9
	10	9.90	5.31	19.6	9.42	5.40	20.0	8.64	5.46	27.1	7.16	5.48	20.3	1.49	73	206	0.9
M5ACV055CR	4	10.11	5.91	12.5	9.71	6.23	13.2	9.20	6.94	14.9	8.56	7.51	15.9	1.58	170	211	0.9
	5	12.50	6.04	12.8	12.07	6.37	13.5	11.44	7.08	15.2	10.43	7.66	16.2	1.97	155	231	1.0
	6	14.39	6.15	13.1	13.96	6.48	13.7	13.26	7.18	15.5	11.98	7.77	16.5	2.28	140	248	1.1
	7	15.95	6.31	13.4	15.46	6.64	14.1	14.65	7.35	15.8	13.12	7.94	16.9	2.52	127	260	1.1
	8	17.00	6.37	13.5	16.48	6.70	14.2	15.62	7.40	15.9	13.93	7.99	17.0	2.69	118	269	1.2
	9	17.72	6.48	13.8	17.13	6.81	14.5	16.15	7.51	16.2	14.34	8.10	17.2	2.78	112	274	1.2
	10	17.94	6.57	13.9	17.30	6.89	14.6	16.27	7.59	16.4	14.41	8.19	17.4	2.80	111	275	1.2

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)						WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		42			46						
		COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A				
M5ACV030CR	4	5.28	5.39	19.9	3.78	5.41	20.0	1.26	82	194	0.9
	5	5.42	5.40	19.9	3.89	5.43	20.1	1.30	82	196	0.9
	6	5.55	5.42	20.0	4.01	5.45	20.1	1.32	79	197	0.9
	7	5.71	5.44	20.1	4.13	5.47	20.2	1.36	76	199	0.9
	8	5.84	5.46	20.2	4.24	5.50	20.3	1.39	76	201	0.9
	9	5.98	5.47	20.2	4.36	5.52	20.4	1.43	74	203	0.9
	10	6.20	5.50	20.3	4.48	5.56	20.5	1.49	73	206	0.9
M5ACV055CR	4	8.19	8.31	17.6	8.15	8.34	17.7	1.58	170	211	0.9
	5	9.48	8.46	18.0	9.30	8.49	18.0	1.97	155	231	1.0
	6	10.55	8.57	18.2	10.24	8.60	18.3	2.28	140	248	1.1
	7	11.36	8.76	18.6	10.98	8.79	18.7	2.52	127	260	1.1
	8	11.94	8.80	18.7	11.51	8.83	18.7	2.69	118	269	1.2
	9	12.28	8.91	18.9	11.83	8.95	19.0	2.78	112	274	1.2
	10	12.38	8.99	19.1	11.95	8.96	19.0	2.80	111	275	1.2

## Model : M5ACV075CR - Cooling

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)												WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		19			20			25			28						
		COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT				
M5ACV075CR	4	22.22	6.43	11.8	21.80	6.57	12.0	20.83	7.25	13.3	19.94	7.65	14.0	2.86	250	706	1.2
	5	23.07	6.53	12.0	22.66	6.67	12.2	21.81	7.38	13.5	20.99	7.79	14.3	3.08	238	724	1.3
	6	23.78	6.63	12.2	23.38	6.77	12.4	22.62	7.50	13.7	21.87	7.92	14.5	3.27	228	739	1.3
	7	24.34	6.72	12.3	23.95	6.88	12.6	23.28	7.62	14.0	22.58	8.05	14.8	3.41	220	750	1.3
	8	24.76	6.83	12.5	24.38	6.98	12.8	23.78	7.73	14.2	23.12	8.18	15.0	3.51	213	756	1.3
	9	25.04	6.93	12.7	24.67	7.08	13.0	24.12	7.85	14.4	23.48	8.30	15.2	3.58	209	759	1.3
	10	25.42	7.04	12.9	25.05	7.19	13.2	24.51	7.96	14.6	23.87	8.42	15.4	3.65	205	762	1.3

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)												WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		30			32			35			40						
		COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT				
M5ACV075CR		kW	kW	A	kW	kW	A	kW	kW	A	kW	kW	A	m³/hr	kPa	W	A
	4	19.28	7.92	14.5	18.55	8.18	15.0	17.35	8.58	15.7	15.06	9.22	16.9	2.86	250	706	1.2
	5	20.39	8.06	14.8	19.72	8.34	15.3	18.63	8.74	16.0	16.54	9.40	17.2	3.08	238	724	1.3
	6	21.31	8.21	15.0	20.70	8.48	15.6	19.69	8.90	16.3	17.75	9.57	17.6	3.27	228	739	1.3
	7	22.05	8.34	15.3	21.48	8.63	15.8	20.52	9.05	16.6	18.67	9.74	17.9	3.41	220	750	1.3
	8	22.61	8.47	15.5	22.06	8.77	16.1	21.13	9.20	16.9	19.33	9.91	18.2	3.51	213	756	1.3
	9	22.99	8.60	15.8	22.44	8.90	16.3	21.52	9.34	17.1	19.71	10.07	18.5	3.58	209	759	1.3
	10	23.38	8.73	16.0	22.83	9.03	16.6	21.91	9.48	17.4	20.11	10.22	18.7	3.65	205	762	1.3

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)						WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		42			46						
		COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT				
M5ACV075CR		kW	kW	A	kW	kW	A	m³/hr	kPa	W	A
	4	14.04	9.48	17.4	11.83	9.98	18.3	2.86	250	706	1.2
	5	15.61	9.66	17.7	13.59	10.17	18.7	3.08	238	724	1.3
	6	16.88	9.84	18.0	15.00	10.36	19.0	3.27	228	739	1.3
	7	17.85	10.01	18.4	16.05	10.55	19.4	3.41	220	750	1.3
	8	18.52	10.19	18.7	16.75	10.74	19.7	3.51	213	756	1.3
	9	18.89	10.35	19.0	17.09	10.92	20.0	3.58	209	759	1.3
	10	19.30	10.52	19.3	17.51	11.10	20.4	3.65	205	762	1.3

## Model : M5ACV100 / 135CR - Cooling

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)												WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		19			20			25			28						
		COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A	kW	kW	A				
M5ACV100CR	4	30.76	8.99	18.3	30.29	9.15	18.6	27.91	9.93	20.2	26.48	10.40	21.1	3.98	218	951	1.8
	5	31.84	9.05	18.4	31.48	9.20	18.7	29.14	10.04	20.4	27.73	10.57	21.5	4.25	203	975	1.9
	6	32.68	9.09	18.5	32.33	9.26	18.8	30.00	10.16	20.7	28.60	10.72	21.8	4.40	195	987	1.9
	7	34.00	9.15	18.6	33.88	9.32	18.9	31.59	10.27	20.9	30.22	10.91	22.2	4.79	173	1013	1.9
	8	34.36	9.18	18.7	34.01	9.38	19.1	31.71	10.40	21.1	30.33	11.03	22.4	4.83	170	1015	2.0
	9	35.20	9.23	18.8	34.85	9.44	19.2	32.57	10.52	21.4	31.20	11.19	22.7	4.86	168	1017	2.0
M5ACV135CR	4	42.58	11.80	22.4	41.93	12.01	22.8	38.64	13.04	24.8	36.66	13.65	25.9	5.51	203	820	1.8
	5	44.08	11.87	22.5	43.58	12.08	22.9	40.34	13.18	25.0	38.39	13.87	26.3	5.89	191	841	1.9
	6	45.24	11.93	22.7	44.75	12.16	23.1	41.52	13.34	25.3	39.59	14.08	26.7	6.10	184	853	1.9
	7	47.07	12.01	22.8	46.90	12.23	23.2	43.74	13.48	25.6	41.84	14.31	27.2	6.63	165	882	2.0
	8	47.57	12.05	22.9	47.08	12.31	23.4	43.90	13.65	25.9	41.99	14.48	27.5	6.68	163	884	2.0
	9	48.73	12.11	23.0	48.25	12.38	23.5	45.09	13.80	26.2	43.19	14.68	27.9	6.73	161	887	2.0
M5ACV135CR	10	49.56	12.16	23.1	48.92	12.46	23.7	45.76	13.97	26.5	43.87	14.87	28.2	6.78	159	890	2.0

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)												WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		30			32			35			40						
		COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A	kW	kW	A				
M5ACV100CR	4	25.53	10.72	21.8	24.58	11.03	22.4	23.16	11.50	23.4	20.78	12.28	25.0	3.98	218	951	1.8
	5	26.79	10.92	22.2	25.85	11.27	22.9	24.72	11.73	23.9	22.10	12.67	25.8	4.25	203	975	1.9
	6	27.66	11.10	22.6	26.73	11.47	23.3	25.61	11.98	24.4	23.00	12.97	26.4	4.40	195	987	1.9
	7	29.31	11.33	23.0	28.39	11.76	23.9	27.84	12.00	24.4	24.74	13.46	27.4	4.79	173	1013	1.9
	8	29.41	11.46	23.3	28.49	11.88	24.1	28.06	12.49	25.4	24.81	13.57	27.6	4.83	170	1015	2.0
	9	30.29	11.63	23.6	29.37	12.08	24.6	28.28	12.74	25.9	25.72	13.87	28.2	4.86	168	1017	2.0
	10	30.78	11.78	24.0	29.86	12.24	24.9	28.49	12.93	26.3	26.21	14.07	28.6	4.90	166	1019	2.0
M5ACV135CR	4	35.35	14.06	26.7	34.03	14.47	27.5	32.05	15.09	28.7	28.76	16.12	30.6	5.51	203	820	1.8
	5	37.09	14.33	27.2	35.79	14.79	28.1	34.22	15.40	29.3	30.59	16.64	31.6	5.89	191	841	1.9
	6	38.30	14.57	27.7	37.01	15.06	28.6	35.45	15.73	29.9	31.84	17.03	32.3	6.10	184	853	1.9
	7	40.57	14.87	28.2	39.31	15.43	29.3	38.54	15.75	30.0	34.25	17.66	33.5	6.63	165	882	2.0
	8	40.72	15.04	28.6	39.44	15.59	29.6	38.84	16.39	31.2	34.35	17.81	33.8	6.68	163	884	2.0
	9	41.93	15.27	29.0	40.66	15.86	30.1	39.14	16.72	31.8	35.60	18.20	34.6	6.73	161	887	2.0
	10	42.60	15.47	29.4	41.34	16.07	30.5	39.44	16.97	32.3	36.28	18.47	35.1	6.78	159	890	2.0

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)						WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		42			46						
		COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A				
M5ACV100CR	4	19.83	12.59	25.6	17.93	13.22	26.9	3.98	218	951	1.8
	5	21.16	13.02	26.5	19.12	14.21	28.9	4.25	203	975	1.9
	6	22.07	13.35	27.1	20.04	14.48	29.4	4.40	195	987	1.9
	7	23.82	13.88	28.2	21.51	14.97	30.4	4.79	173	1013	1.9
	8	23.89	13.99	28.4	21.89	15.02	30.5	4.83	170	1015	2.0
	9	24.81	14.32	29.1	22.82	15.29	31.1	4.86	168	1017	2.0
	10	25.30	14.53	29.5	23.47	15.45	31.4	4.90	166	1019	2.0
M5ACV135CR	4	27.45	16.53	31.4	24.82	17.35	33.0	5.51	203	820	1.8
	5	29.29	17.09	32.5	26.47	18.64	35.4	5.89	191	841	1.9
	6	30.55	17.52	33.3	27.75	19.00	36.1	6.10	184	853	1.9
	7	32.98	18.22	34.6	29.78	19.65	37.3	6.63	165	882	2.0
	8	33.08	18.37	34.9	30.31	19.71	37.4	6.68	163	884	2.0
	9	34.34	18.79	35.7	31.59	20.07	38.1	6.73	161	887	2.0
	10	35.02	19.07	36.2	32.49	20.27	38.5	6.78	159	890	2.0

## Model : M5ACV 210CR - Cooling

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)												WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		19			20			25			28						
		COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A	kW	kW	A				
M5ACV210CR	4	63.80	17.42	34.9	62.40	17.76	35.5	59.43	18.72	37.5	57.03	19.53	39.1	8.31	245	1232	2.2
	5	66.15	17.43	34.9	65.03	17.78	35.6	62.45	18.74	37.5	60.19	19.66	39.4	8.80	234	1259	2.3
	6	68.03	17.44	34.9	67.15	17.81	35.7	64.91	18.78	37.6	62.80	19.79	39.6	9.22	225	1282	2.3
	7	70.10	17.46	35.0	68.77	17.84	35.7	66.29	18.85	37.7	64.51	19.90	39.8	9.58	216	1301	2.3
	8	70.40	17.49	35.0	69.87	17.88	35.8	68.18	18.95	37.9	66.38	20.00	40.0	9.86	209	1317	2.4
	9	70.89	17.52	35.1	70.46	17.92	35.9	68.98	19.07	38.2	67.33	20.09	40.2	10.08	203	1328	2.4
	10	70.92	17.56	35.2	70.55	17.97	36.0	69.23	19.21	38.5	67.75	20.17	40.4	10.23	199	1336	2.4

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)												WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		30			32			35			40						
		COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT				
M5ACV210CR		kW	kW	A	kW	kW	A	kW	kW	A	kW	kW	A	m³/hr	kPa	W	A
	4	55.35	20.11	40.3	53.61	20.72	41.5	50.87	21.70	43.4	46.01	23.51	47.1	8.31	245	1232	2.2
	5	58.53	20.34	40.7	56.76	20.94	41.9	53.87	21.94	43.9	48.46	23.73	47.5	8.80	234	1259	2.3
	6	61.19	20.52	41.1	59.42	21.13	42.3	56.45	22.14	44.3	50.70	23.91	47.9	9.22	225	1282	2.3
	7	62.72	20.67	41.4	61.12	21.28	42.6	58.62	22.30	44.6	52.41	24.06	48.2	9.58	216	1301	2.3
	8	64.92	20.76	41.6	63.25	21.39	42.8	60.37	22.42	44.9	54.54	24.17	48.4	9.86	209	1317	2.4
	9	65.98	20.82	41.7	64.42	21.46	43.0	61.70	22.49	45.0	56.14	24.25	48.5	10.08	203	1328	2.4
	10	66.52	20.83	41.7	65.10	21.50	43.0	62.62	22.52	45.1	57.54	24.29	48.6	10.23	199	1336	2.4

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)						WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		42			46						
		COOL CAP.	POWER INPUT	RUNNING CURRENT	COOL CAP.	POWER INPUT	RUNNING CURRENT				
M5ACV210CR		kW	kW	A	kW	kW	A	m³/hr	kPa	W	A
	4	43.95	24.29	48.6	39.65	25.96	52.0	8.31	245	1232	2.2
	5	46.08	24.48	49.0	40.97	26.05	52.1	8.80	234	1259	2.3
	6	48.11	24.64	49.3	42.44	26.14	52.3	9.22	225	1282	2.3
	7	49.83	24.77	49.6	44.07	26.23	52.5	9.58	216	1301	2.3
	8	51.85	24.88	49.8	45.85	26.33	52.7	9.86	209	1317	2.4
	9	53.56	24.96	50.0	47.78	26.42	52.9	10.08	203	1328	2.4
10	55.17	25.02	50.1	49.87	26.51	53.1	10.23	199	1336	2.4	

## Model : M5ACV 030 / 055CR - Heating

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)									WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		-7			-5			0						
		HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A	m3/hr	kPa	W	A
M5ACV030CR	35	3.82	3.77	14.4	5.04	3.80	14.5	7.82	3.83	14.7	1.89	57	227	1.0
	40	2.71	4.02	15.4	4.08	4.05	15.5	7.11	4.11	15.7	1.80	61	222	1.0
	45	1.61	4.42	16.9	3.03	4.45	17.0	6.20	4.50	17.2	1.66	70	215	0.9
	50	0.66	4.67	17.9	2.00	4.70	18.0	5.02	4.77	18.3	1.44	77	204	0.9
	55	0.31	4.99	19.1	1.27	5.03	19.2	3.56	5.10	19.5	1.12	93	186	0.8
M5ACV055CR	35	12.55	4.71	10.8	13.51	4.84	11.1	15.11	5.06	11.6	2.74	114	272	1.2
	40	12.12	5.09	11.7	12.87	5.18	11.9	14.57	5.32	12.2	2.71	116	270	1.2
	45	11.73	5.35	12.3	12.47	5.51	12.6	14.16	5.80	13.3	2.64	120	266	1.2
	50	10.05	5.75	13.2	10.78	5.85	13.4	12.45	6.02	13.8	2.35	137	251	1.1
	55	7.08	6.13	14.0	7.80	6.19	14.2	9.45	6.31	14.4	1.83	161	224	1.0

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)									WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		4			7			10						
		HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A	m3/hr	kPa	W	A
M5ACV030CR	35	9.74	3.84	14.7	11.00	3.83	18.3	12.11	3.81	14.6	1.89	57	227	1.0
	40	9.15	4.14	15.8	10.44	4.14	19.7	11.54	4.14	15.8	1.80	61	222	1.0
	45	8.32	4.45	17.0	9.67	4.51	21.5	10.82	4.50	17.2	1.66	70	215	0.9
	50	7.07	4.80	18.4	8.39	4.81	22.9	9.54	4.80	18.4	1.44	77	204	0.9
	55	5.28	5.12	19.6	6.50	5.13	24.4	7.66	5.12	19.6	1.12	93	186	0.8
M5ACV055CR	35	15.94	5.10	11.7	16.77	5.07	11.9	17.41	4.98	11.4	2.74	114	272	1.2
	40	15.74	5.34	12.2	16.50	5.31	12.5	17.17	5.25	12.0	2.71	116	270	1.2
	45	15.34	5.86	13.4	16.12	5.85	13.7	16.82	5.74	13.1	2.64	120	266	1.2
	50	13.63	6.05	13.9	14.43	6.03	14.2	15.15	5.97	13.7	2.35	137	251	1.1
	55	10.63	6.33	14.5	11.43	6.32	14.8	12.15	6.28	14.4	1.83	161	224	1.0

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)						WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		15			21						
		HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	m3/hr	kPa	W	A
M5ACV030CR	35	13.63	3.76	14.4	14.90	3.67	14.1	1.89	57	227	1.0
	40	12.93	4.10	15.7	13.88	4.03	15.4	1.80	61	222	1.0
	45	12.27	4.45	17.0	13.27	4.37	16.7	1.66	70	215	0.9
	50	11.56	4.77	18.2	12.19	4.70	18.0	1.44	77	204	0.9
	55	9.46	5.07	19.4	11.40	4.99	19.1	1.12	93	186	0.8
M5ACV055CR	35	18.27	4.70	10.8	19.14	4.15	9.5	2.74	114	272	1.2
	40	18.07	5.05	11.6	18.79	4.66	10.7	2.71	116	270	1.2
	45	17.79	5.42	12.4	18.65	4.80	11.0	2.64	120	266	1.2
	50	16.17	5.77	13.2	17.11	5.36	12.3	2.35	137	251	1.1
	55	13.20	6.15	14.1	14.17	5.89	13.5	1.83	161	224	1.0



## Model : M5ACV 075CR - Heating

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)									WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		-7			-5			0						
		HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A	m3/hr	kPa	W	A
M5ACV075CR	35	14.25	6.87	13.4	16.02	6.92	13.5	19.83	7.06	13.8	4.00	183	748	1.4
	40	12.74	7.43	14.5	14.68	7.47	14.6	18.82	7.59	14.8	3.87	191	749	1.4
	45	11.32	8.02	15.6	13.36	8.05	15.7	17.70	8.17	15.9	3.71	201	750	1.4
	50	10.00	8.64	16.8	12.06	8.66	16.9	16.45	8.80	17.2	3.50	214	751	1.3
	55	8.75	9.30	18.1	10.77	9.32	18.2	15.08	9.48	18.5	3.26	228	752	1.3

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)									WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		4			7			10						
		HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A				
M5ACV075CR	35	22.24	7.24	14.1	23.68	6.78	13.2	24.80	6.83	13.3	4.00	183	748	1.4
	40	21.42	7.78	15.2	22.95	7.31	14.3	24.11	7.38	14.4	3.87	191	749	1.4
	45	20.40	8.36	16.3	21.98	7.90	15.4	23.17	7.95	15.5	3.71	201	750	1.4
	50	19.18	8.98	17.5	20.78	8.55	16.7	21.98	8.60	16.8	3.50	214	751	1.3
	55	17.76	9.63	18.8	19.34	9.26	18.1	20.53	9.28	18.1	3.26	228	752	1.3

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)						WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		15			21						
		HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A				
M5ACV075CR	35	25.44	6.50	12.7	26.18	5.93	11.6	4.00	183	748	1.4
	40	24.75	7.07	13.8	25.31	6.54	12.8	3.87	191	749	1.4
	45	23.83	7.60	14.8	24.27	7.15	13.9	3.71	201	750	1.4
	50	22.65	8.29	16.2	23.05	7.75	15.1	3.50	214	751	1.3
	55	21.24	8.94	17.4	21.66	8.34	16.3	3.26	228	752	1.3

## Model : M5ACV100 / 135CR - Heating

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)									WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		-7			-5			0						
		HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A				
M5ACV100CR	35	28.34	9.48	19.8	29.27	9.52	19.9	31.59	9.64	20.2	5.81	107	1049	2.0
	40	24.46	10.13	21.2	25.58	10.19	21.3	28.38	10.36	21.7	5.41	134	1040	2.0
	45	20.58	10.78	22.6	21.90	10.87	22.7	25.17	11.08	23.2	5.04	157	1026	2.0
	50	16.71	11.44	23.9	18.21	11.54	24.1	21.96	11.80	24.7	4.64	182	1003	1.9
	55	12.83	12.09	25.3	14.52	12.22	25.6	18.75	12.53	26.2	4.24	204	974	1.9
M5ACV135CR	35	40.10	13.51	26.0	41.41	13.57	26.1	44.70	13.74	26.4	8.22	97	958	2.1
	40	34.61	14.44	27.8	36.20	14.53	28.0	40.16	14.77	28.4	7.65	123	933	2.0
	45	29.12	15.37	29.6	30.98	15.49	29.8	35.62	15.80	30.4	7.13	145	907	2.0
	50	23.64	16.30	31.4	25.76	16.45	31.7	31.08	16.83	32.4	6.56	168	878	1.9
	55	18.15	17.24	33.2	20.55	17.41	33.5	26.53	17.86	34.4	6.01	187	848	1.6

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)									WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		4			7			10						
		HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A				
M5ACV100CR	35	32.72	9.73	20.3	33.77	9.84	20.6	36.69	9.88	20.7	5.81	107	1049	2.0
	40	29.00	10.49	21.9	31.45	10.62	22.2	34.29	10.64	22.2	5.41	134	1040	2.0
	45	27.80	11.25	23.5	29.31	11.40	23.8	31.47	11.47	24.0	5.04	157	1026	2.0
	50	24.64	12.01	25.1	26.97	12.18	25.5	29.48	12.31	25.8	4.64	182	1003	1.9
	55	22.14	12.78	26.7	24.68	12.96	27.1	27.08	13.15	27.5	4.24	204	974	1.9
M5ACV135CR	35	46.29	13.87	26.7	47.78	14.02	26.8	51.91	14.08	27.1	8.22	97	958	2.1
	40	41.03	14.95	28.8	44.50	15.14	28.9	48.51	15.16	29.2	7.65	123	933	2.0
	45	39.33	16.04	30.9	41.47	16.25	31.1	44.53	16.36	31.5	7.13	145	907	2.0
	50	34.87	17.13	33.0	38.16	17.36	33.2	41.71	17.55	33.8	6.56	168	878	1.9
	55	31.32	18.21	35.0	34.92	18.48	35.3	38.32	18.75	36.1	6.01	187	848	1.6

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)						WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		15			21						
		HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A				
M5ACV100CR	35	42.37	10.00	20.9	47.99	10.09	21.1	5.81	107	1049	2.0
	40	39.62	10.87	22.7	44.91	11.01	23.0	5.41	134	1040	2.0
	45	36.71	11.73	24.5	41.84	11.93	25.0	5.04	157	1026	2.0
	50	34.14	12.60	26.4	38.76	12.85	26.9	4.64	182	1003	1.9
	55	31.39	13.46	28.2	36.53	13.77	28.8	4.24	204	974	1.9
M5ACV135CR	35	59.94	14.26	27.4	67.90	14.39	27.7	8.22	97	958	2.1
	40	56.06	15.49	29.8	63.55	15.70	30.2	7.65	123	933	2.0
	45	51.94	16.72	32.2	59.19	17.07	32.9	7.13	145	907	2.0
	50	48.30	17.96	34.6	54.84	18.32	35.3	6.56	168	878	1.9
	55	44.42	19.19	36.9	51.69	19.72	38.0	6.01	187	848	1.6

## Model : M5ACV 210CR - Heating

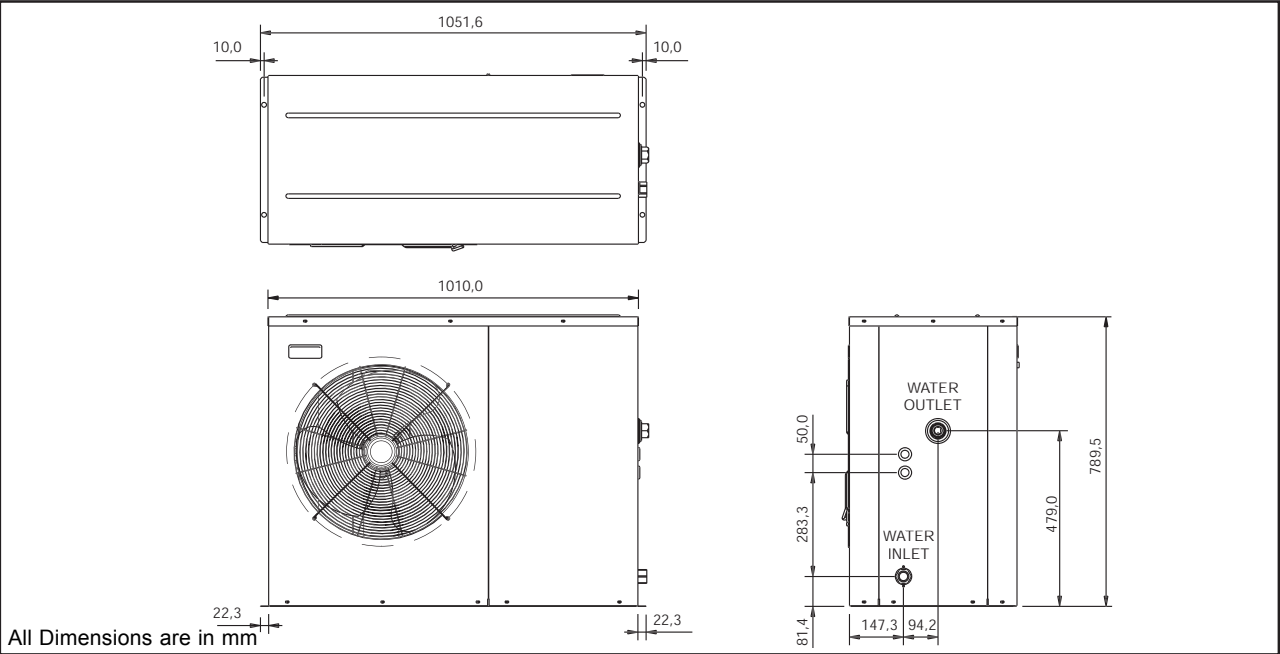
MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)									WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		-7			-5			0						
		HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A				
M5ACV210CR	35	46.14	18.00	36.8	46.75	18.01	36.8	54.77	18.12	37.0	10.75	185	1363	2.5
	40	45.01	19.54	40.0	45.84	19.55	40.0	53.59	19.64	40.2	10.50	192	1350	2.4
	45	43.87	21.30	43.6	44.88	21.31	43.6	52.51	21.43	43.8	10.30	197	1340	2.4
	50	42.07	23.24	47.5	43.16	23.27	47.6	51.19	23.50	48.0	10.12	202	1330	2.4
	55	39.76	25.42	52.0	40.93	25.47	52.1	49.62	25.82	52.8	10.01	205	1324	2.4

MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)									WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		4			7			10						
		HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A	kW	kW	A				
M5ACV210CR	35	59.69	18.30	37.4	64.26	18.48	37.8	67.08	18.72	38.3	10.75	185	1363	2.5
	40	58.48	19.79	40.4	62.73	19.93	40.8	65.83	20.12	41.1	10.50	192	1350	2.4
	45	57.44	21.59	44.1	61.55	21.80	44.6	64.84	21.93	44.8	10.30	197	1340	2.4
	50	56.40	23.76	48.6	60.48	23.87	48.8	64.22	24.06	49.2	10.12	202	1330	2.4
	55	55.26	26.12	53.4	59.82	26.37	53.9	63.71	26.64	54.5	10.01	205	1324	2.4

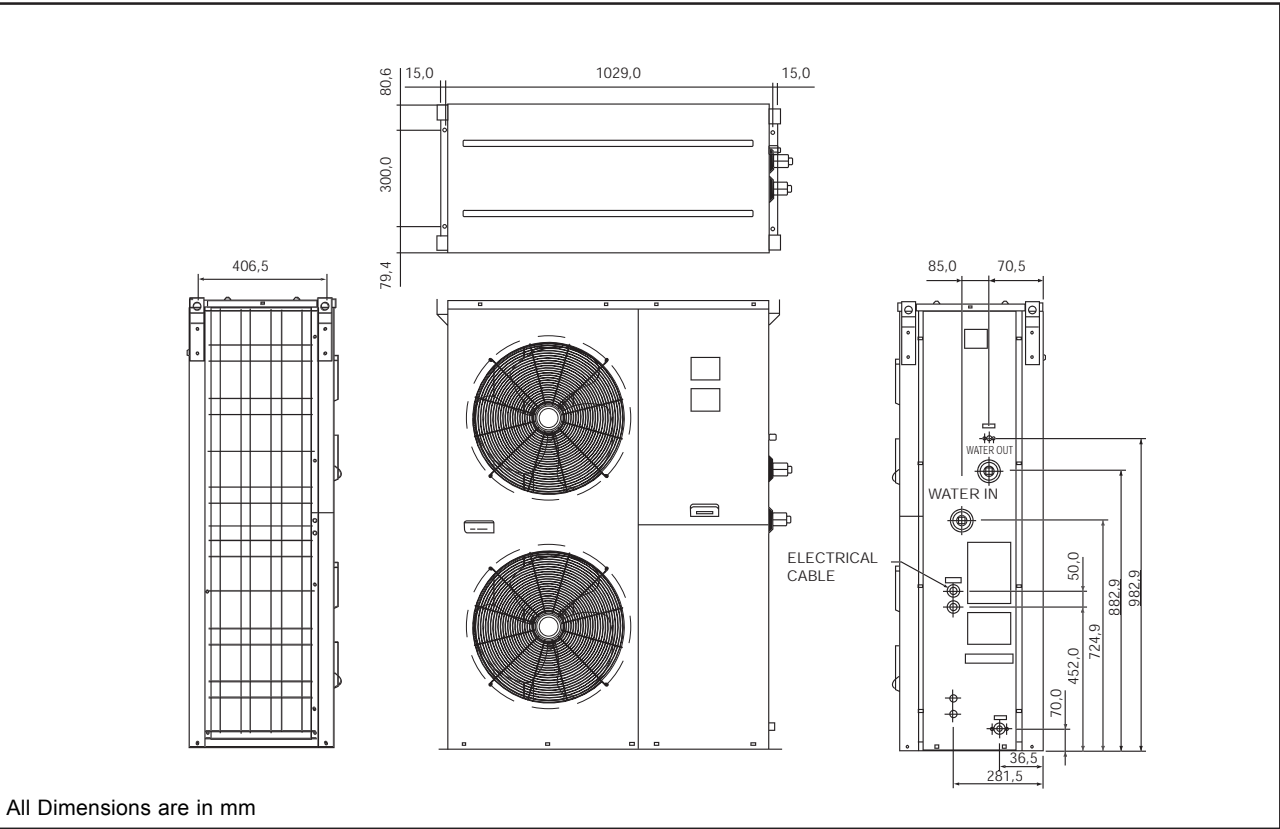
MODEL	LEAVING WATER TEMP (°C)	AMBIENT TEMPERATURE ON CONDENSOR (°C)						WATER FLOW RATE	AVAIL. HEAD PRESS.	PUMP INPUT POWER	PUMP INPUT AMP
		15			21						
		HEAT CAP.	POWER INPUT	RUNNING CURRENT	HEAT CAP.	POWER INPUT	RUNNING CURRENT				
		kW	kW	A	kW	kW	A				
M5ACV210CR	35	72.36	19.21	39.3	83.37	20.82	42.6	10.75	185	1363	2.5
	40	70.88	20.50	41.9	81.98	22.03	45.0	10.50	192	1350	2.4
	45	69.72	24.43	49.9	81.04	23.97	49.0	10.30	197	1340	2.4
	50	69.72	24.43	49.9	80.82	26.10	53.4	10.12	202	1330	2.4
	55	69.00	27.16	55.5	29.14	29.14	59.6	10.01	205	1324	2.4

# Dimensional Data

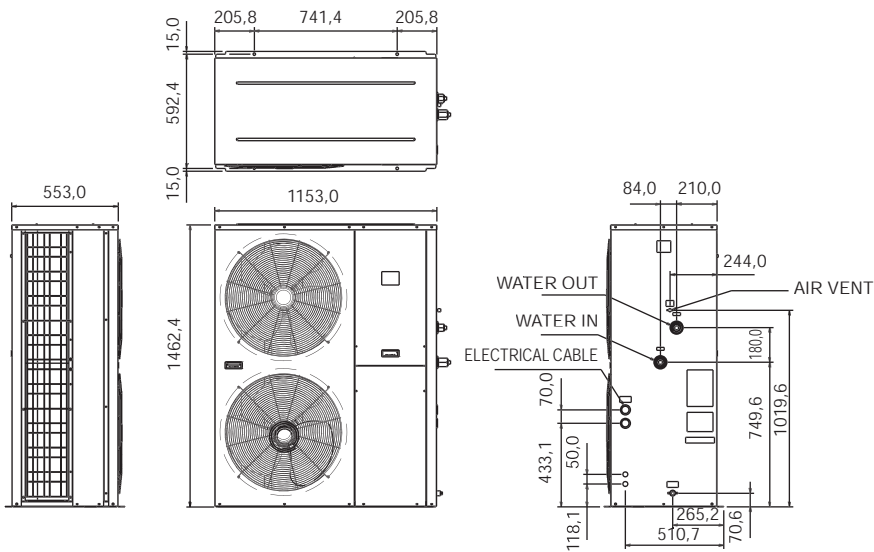
Model : M5ACV 030CR



Model : M5ACV 055CR

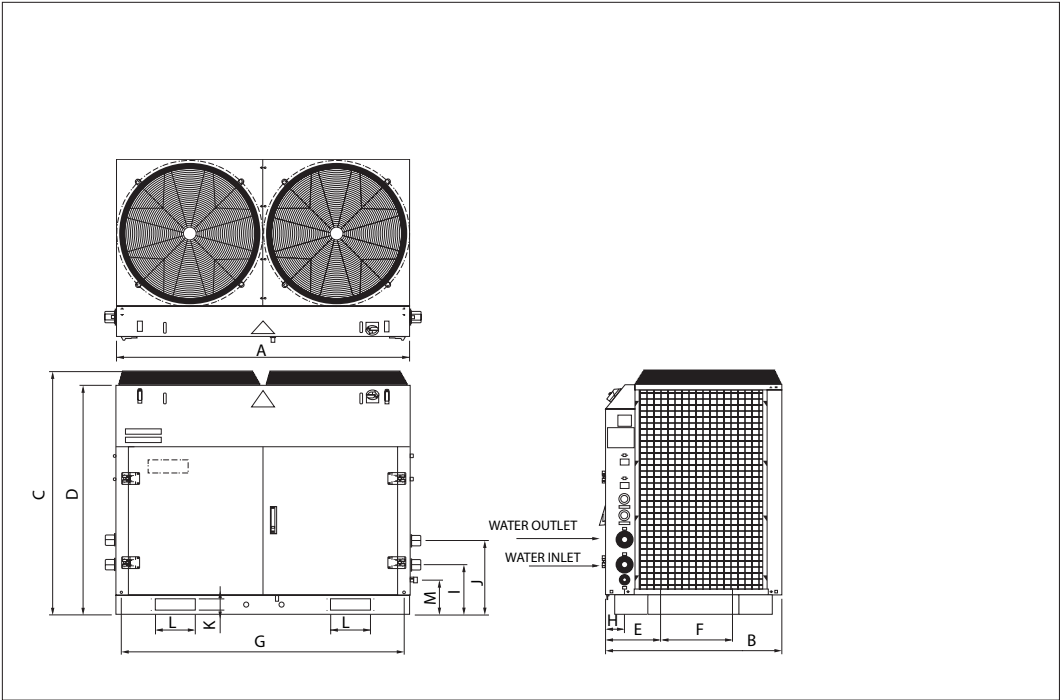


**Model : M5ACV 075CR**



All Dimensions are in mm

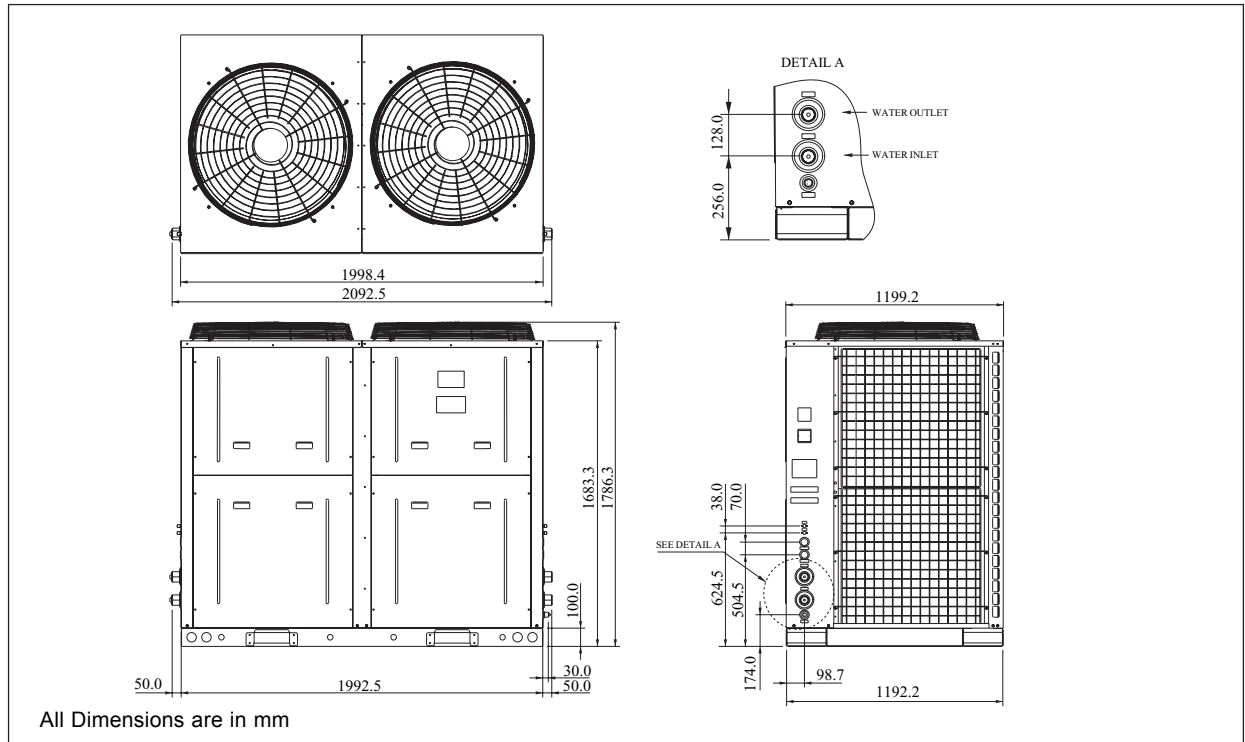
Model : M5ACV100 / 135CR



All Dimensions are in mm

Model	A	B	C	D	E	F	G
						Base Leg Hole	
M5ACV100CR	1500	900	1245	1190	297.5	307.5	1446
M5ACV135CR	1800	1150	1245	1190	347.5	416	1766

Model	H	I	J	K	L	M
M5ACV100CR	100	265	385	60	200	170
M5ACV135CR	10	265	385	60	200	170



All Dimensions are in mm

# Electrical Data

## Electrical Data - Heat Pump R410A Inverter

MODEL			M5ACV030CR	M5ACV055CR
CONDENSER FAN MOTOR	INSULATION GRADE		F	F
	POWER SOURCE	V/Ph/Hz	220 - 240 / 1 / 50	
	RATED INPUT POWER	W	135	270
	RATED RUNNING CURRENT	A	0.6	1.3
	MOTOR OUTPUT	W	-	-
	POLES		6	6
COMPRESSOR	INSULATION GRADE		E	F
	POWER SOURCE	V/Ph/Hz	220 - 240 / 1 / 50	380 - 415 / 3 / 50
	CAPACITOR	µF	NA	NA
	RATED INPUT POWER (COOLING)	W	4945	6630
	RATED INPUT POWER (HEATING)	W	4077	5130
	RATED RUNNING CURRENT (COOLING)	A	18.3	13.5
	RATED RUNNING CURRENT (HEATING)	A	15.7	11.4
	LOCKED ROTOR AMP.	A	NA	NA
WATER PUMP	INSULATION GRADE		F	F
	POWER SOURCE	V/Ph/Hz	220 - 240 / 1 / 50	380 - 415 / 3 / 50
	RATED INPUT POWER (COOLING)	W	199	700
	RATED INPUT POWER (HEATING)	W	206	700
	RATED RUNNING CURRENT (COOLING)	A	0.9	1.3
	RATED RUNNING CURRENT (HEATING)	A	0.9	1.3

- 1) ALL SPECIFICATIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.  
2) ALL UNITS ARE BEING TESTED AND COMPLY TO ISO 5151.

MODEL			M5ACV075CR
CONDENSER FAN MOTOR	INSULATION GRADE		B
	POWER SOURCE	V/Ph/Hz	220 - 240 / 1 / 50
	RATED INPUT POWER	W	300 x2
	RATED RUNNING CURRENT	A	1.5 x2
	MOTOR OUTPUT	W	145 x2
	POLES		8
COMPRESSOR	INSULATION GRADE		E
	POWER SOURCE	V/Ph/Hz	380 - 415 / 3 / 50
	CAPACITOR	µF	NA
	RATED INPUT POWER (COOLING)	W	7700
	RATED INPUT POWER (HEATING)	W	6500
	RATED RUNNING CURRENT (COOLING)	A	14.3
	RATED RUNNING CURRENT (HEATING)	A	13.1
	LOCKED ROTOR AMP.	A	NA
WATER PUMP	INSULATION GRADE		F
	POWER SOURCE	V/Ph/Hz	380 - 415 / 3 / 50
	RATED INPUT POWER (COOLING)	W	750
	RATED INPUT POWER (HEATING)	W	800
	RATED RUNNING CURRENT (COOLING)	A	1.3
	RATED RUNNING CURRENT (HEATING)	A	1.4

- 1) ALL SPECIFICATIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.  
2) ALL UNITS ARE BEING TESTED AND COMPLY TO ISO 5151.

## Electrical Data - Heat pump R410A Inverter

MODEL			M5ACV100CR	M5ACV135CR
CONDENSER FAN MOTOR	INSULATION GRADE		F	F
	POWER SOURCE	V/Ph/Hz	220 - 240 / 1 / 50	
	RATED INPUT POWER	W	500	1430
	RATED RUNNING CURRENT	A	2.2	6.0
	MOTOR OUTPUT	W	200 x2	450 x2
	POLES		8	6
COMPRESSOR	INSULATION GRADE		NA	NA
	POWER SOURCE	V/Ph/Hz	380 - 415 / 3 / 50	
	CAPACITOR	μF	NA	NA
	RATED INPUT POWER (COOLING)	W	10500	13520
	RATED INPUT POWER (HEATING)	W	9900	14020
	RATED RUNNING CURRENT (COOLING)	A	21.9	25.9
	RATED RUNNING CURRENT (HEATING)	A	21.3	27.0
	LOCKED ROTOR AMP.	A	67 / -	111 / -
WATER PUMP	INSULATION GRADE		F	F
	POWER SOURCE	V/Ph/Hz	380 - 415 / 3 / 50	
	RATED INPUT POWER (COOLING)	W	1013	882
	RATED INPUT POWER (HEATING)	W	1026	907
	RATED RUNNING CURRENT (COOLING)	A	2.0	2.0
	RATED RUNNING CURRENT (HEATING)	A	2.0	2.0

- 1) ALL SPECIFICATIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.  
2) ALL UNITS ARE BEING TESTED AND COMPLY TO ISO 5151.



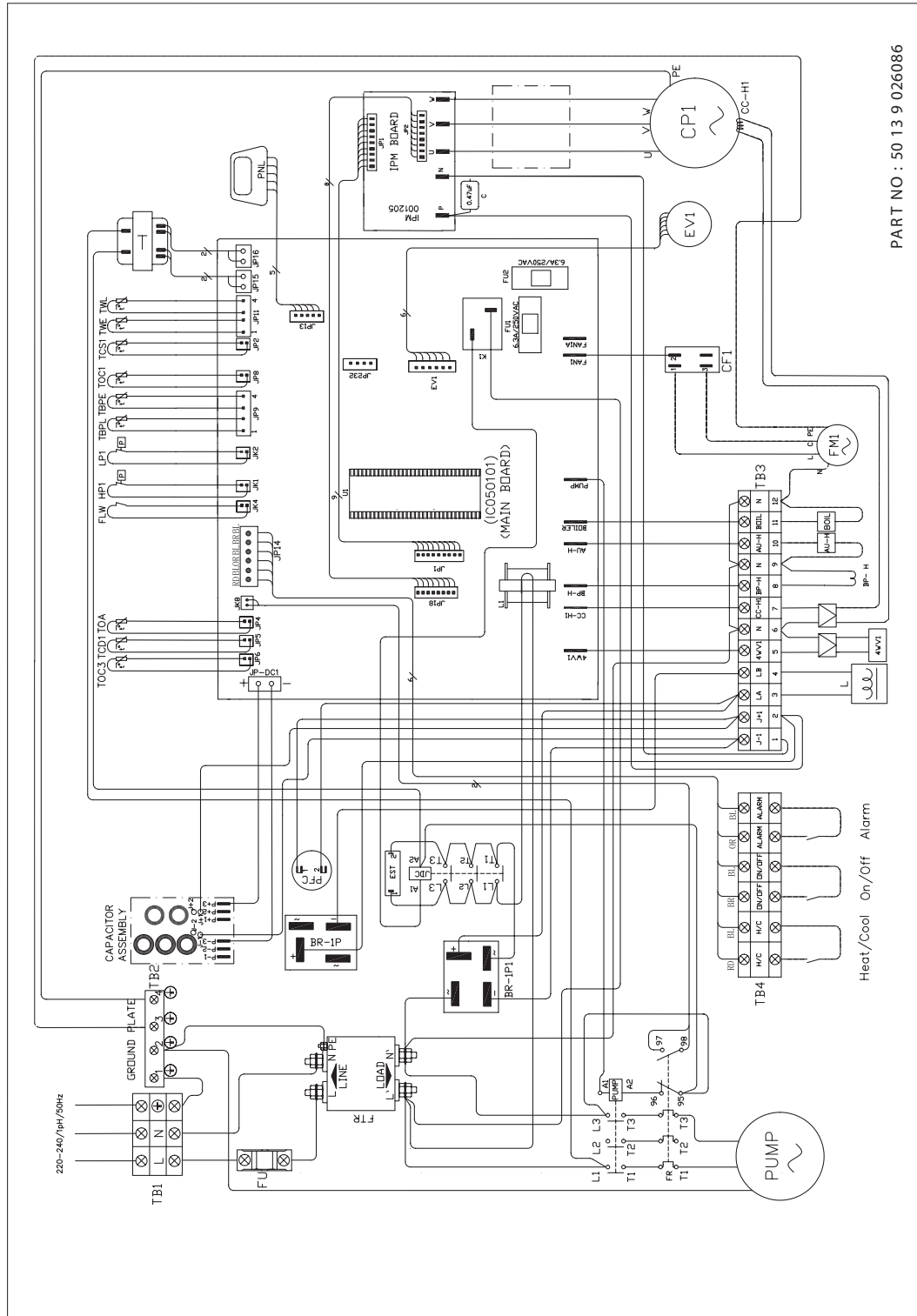
## Electrical Data - Heat pump R410A Inverter

MODEL			M5ACV210CR
CONDENSER FAN MOTOR	INSULATION GRADE		B
	POWER SOURCE	V/Ph/Hz	220 - 240 / 1 / 50
	RATED INPUT POWER	W	820 x2
	RATED RUNNING CURRENT	A	3.6 x2
	MOTOR OUTPUT	W	550 x2
	POLES		8
COMPRESSOR	INSULATION GRADE		E
	POWER SOURCE	V/Ph/Hz	380 - 415 / 3 / 50
	CAPACITOR	μF	NA
	RATED INPUT POWER (COOLING)	W	20200
	RATED INPUT POWER (HEATING)	W	19700
	RATED RUNNING CURRENT (COOLING)	A	38.7
	RATED RUNNING CURRENT (HEATING)	A	38.7
	LOCKED ROTOR AMP.	A	118
WATER PUMP	INSULATION GRADE		F
	POWER SOURCE	V/Ph/Hz	380 - 415 / 3 / 50
	RATED INPUT POWER (COOLING)	W	1300
	RATED INPUT POWER (HEATING)	W	1300
	RATED RUNNING CURRENT (COOLING)	A	2.3
	RATED RUNNING CURRENT (HEATING)	A	2.3

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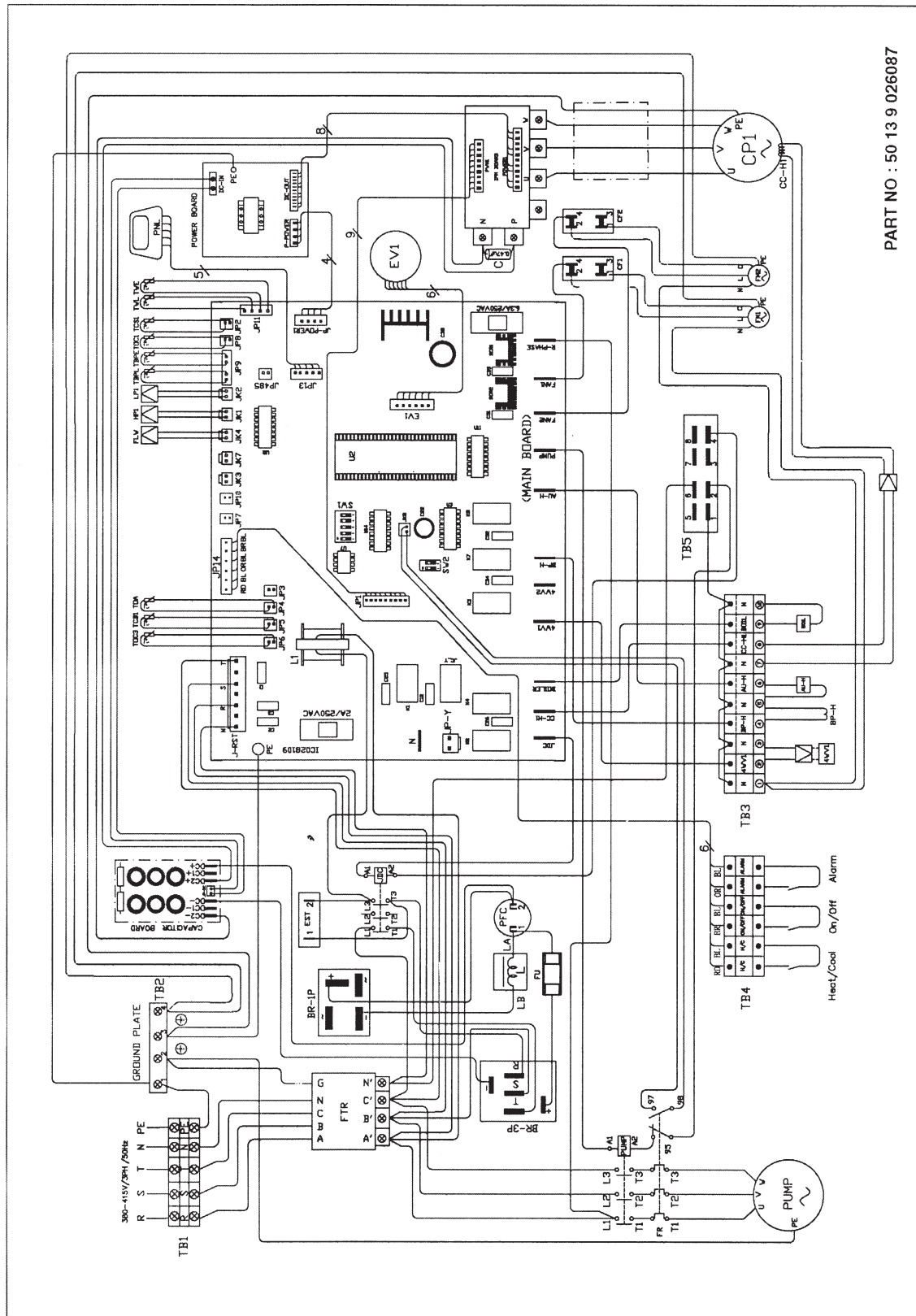
# Wiring Diagrams

Model : M5ACV 030CR



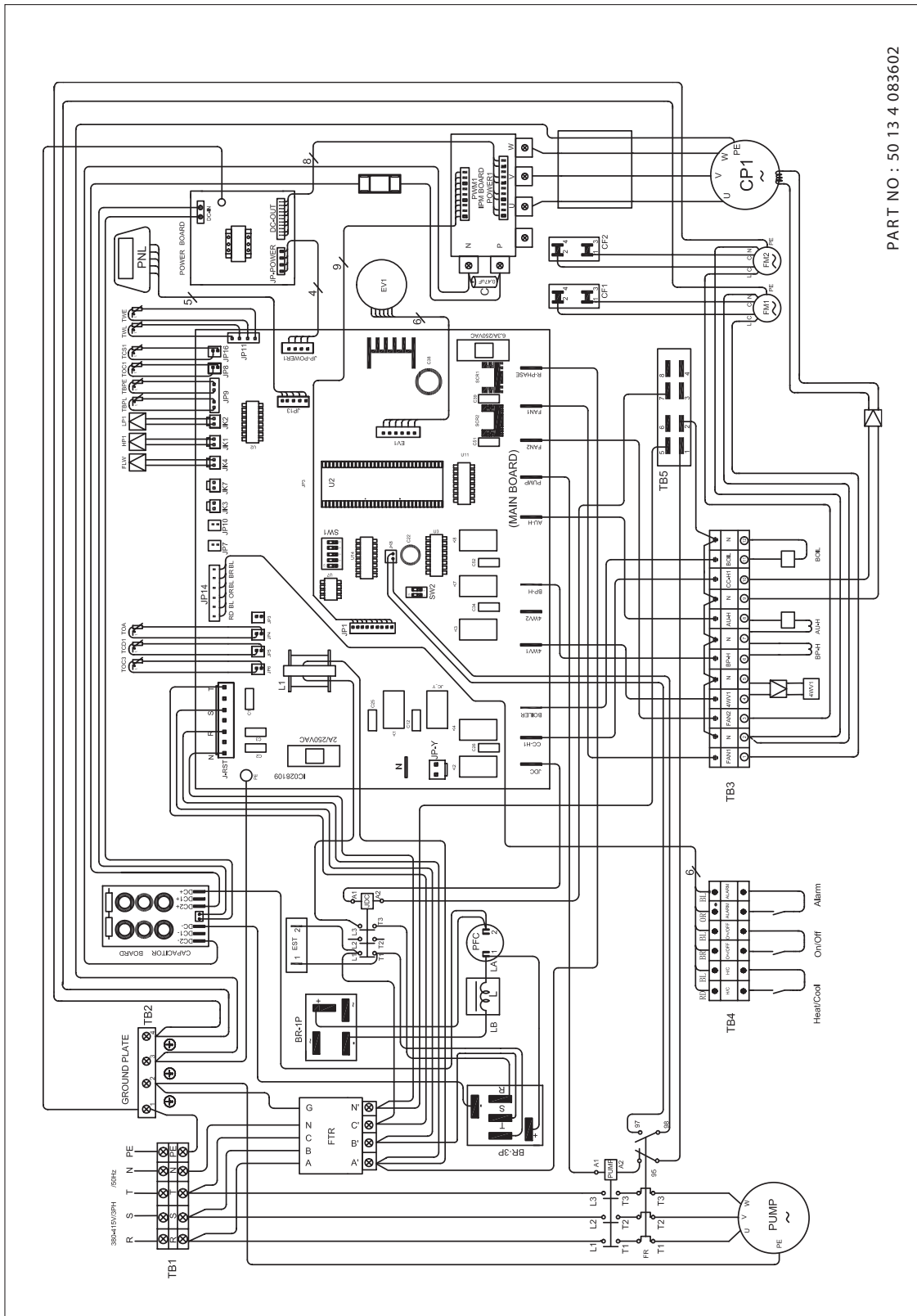
PART NO : 50 13 9 026086

Model : M5ACV 055CR



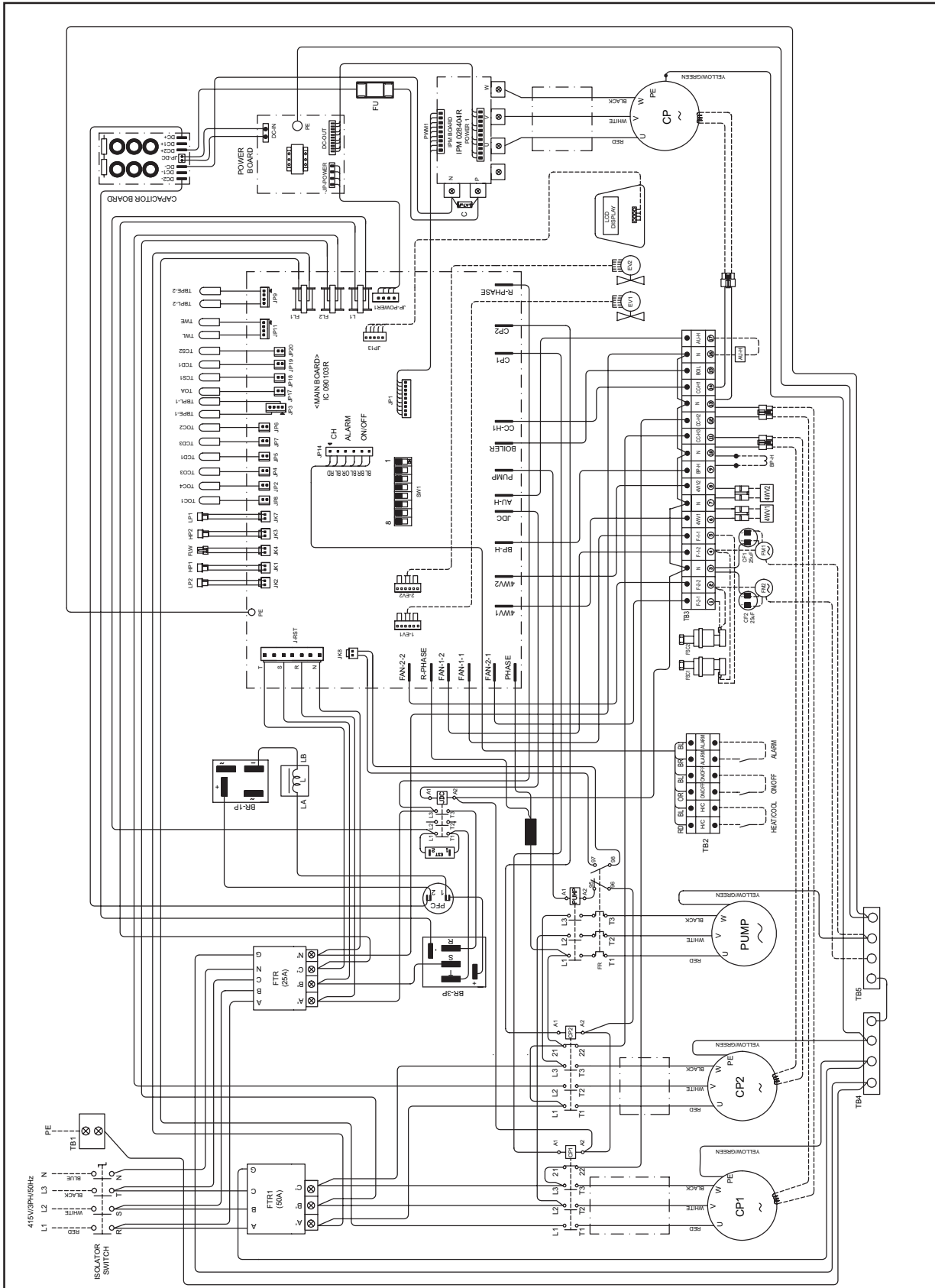
PART NO : 50 13 9 026087

# Model : M5ACV 075CR

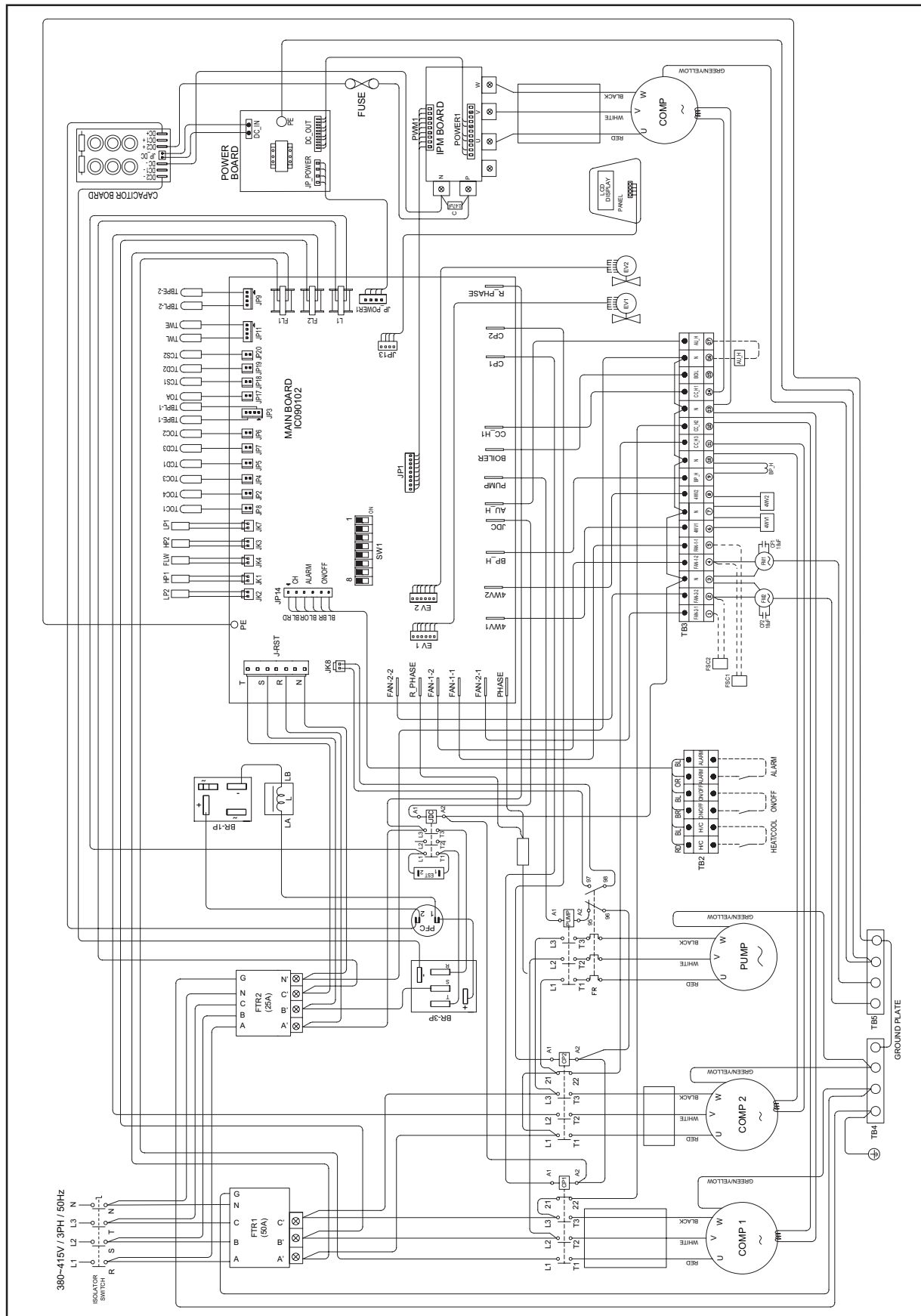


PART NO : 50 13 4 083602

**Model : M5ACV 100/135CR**



# Model : M5ACV 210CR



# **Servicing and Maintenance**

## **Servicing**

Servicing or maintenance of these unit must be carried out by experienced personnel with specific training in refrigeration. Repeated check the safety devices and continuous cycling of control components must be analyzed and corrected before being reset.

The simple design of the refrigeration circuit totally eliminates potential problems during normal unit operation. No maintenance work is needed on the refrigeration circuit as long as the unit is operating normally.

Ease of maintenance has been taken into consideration during the design stage such that the unit is easily accessible for servicing and maintenance. By accessing from the front panel of the unit, servicing and maintenance operation can be done easily. The electrical components are especially easy to access since it is located in the terminal box on top of the front panel.

Under normal circumstances, these chiller require only a check and cleaning of air intake through the coil surface only. These can be done monthly or quarterly depending on the surrounding where the units are installed.

When the surrounding is very oily or dusty, then the coils must be regularly cleaned by a qualified air conditioner service technician to ensure sufficient cooling capacity and efficient unit operation. The normal life span might be shortened if no proper service is provided.

## **Maintenance**

For consistent performance and durability, always conduct proper and regular maintenance to the unit.

For prolong period of operation time, the heat exchanger will become dirty impairing its effectiveness and reducing the performance of the units. Consult your local dealer about the cleaning of the heat exchanger.

No major maintenance or servicing needed for the internal water circuit in the unit except the water pump failure. It is advised that regular check on the strainer to be conducted and change the water strainer if it is dirty or choked.

Always check the water level in the system, in order to protect the moving components in the hydraulic kit from over heating and excessive wear.

# Troubleshooting

When a malfunction of the unit is detected, immediately switch off the main power supply before proceeding with the following troubleshooting procedures.

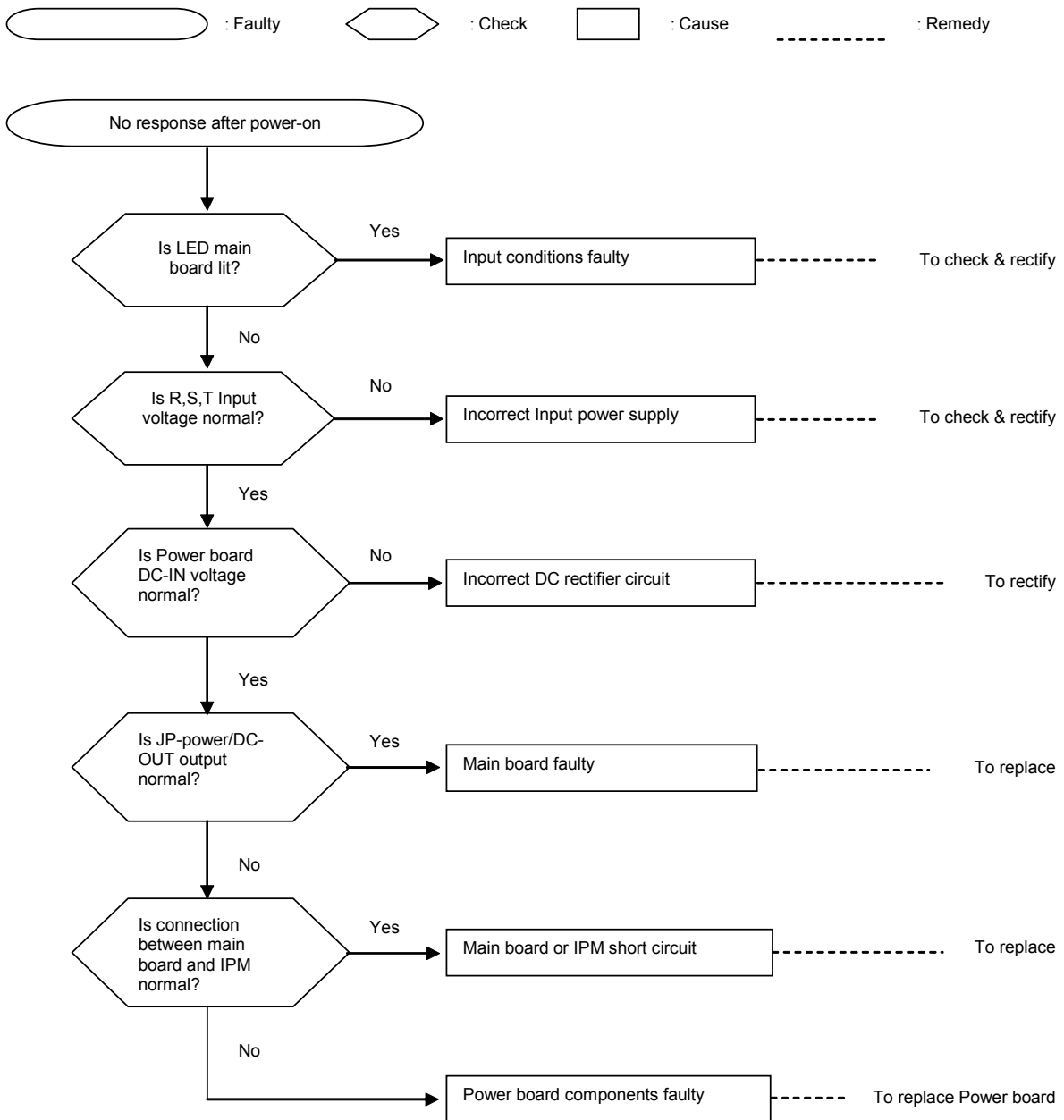
The following are common fault conditions and simple troubleshooting tips. If any other fault conditions that are not listed occur, contact your nearest local dealer. DO NOT attempt to troubleshoot the unit by yourself.

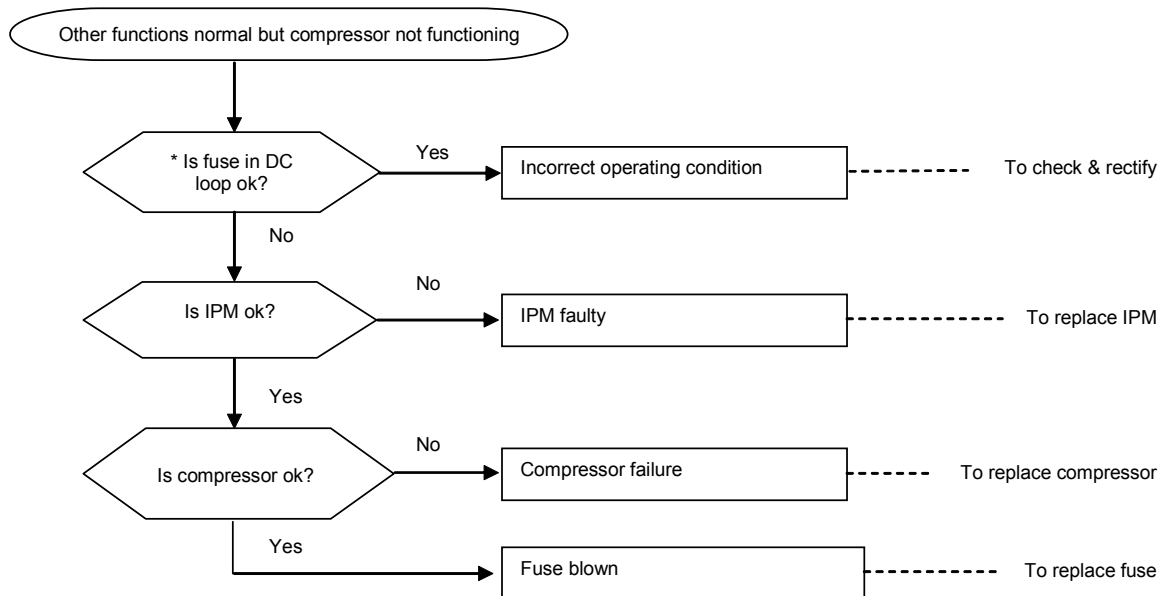
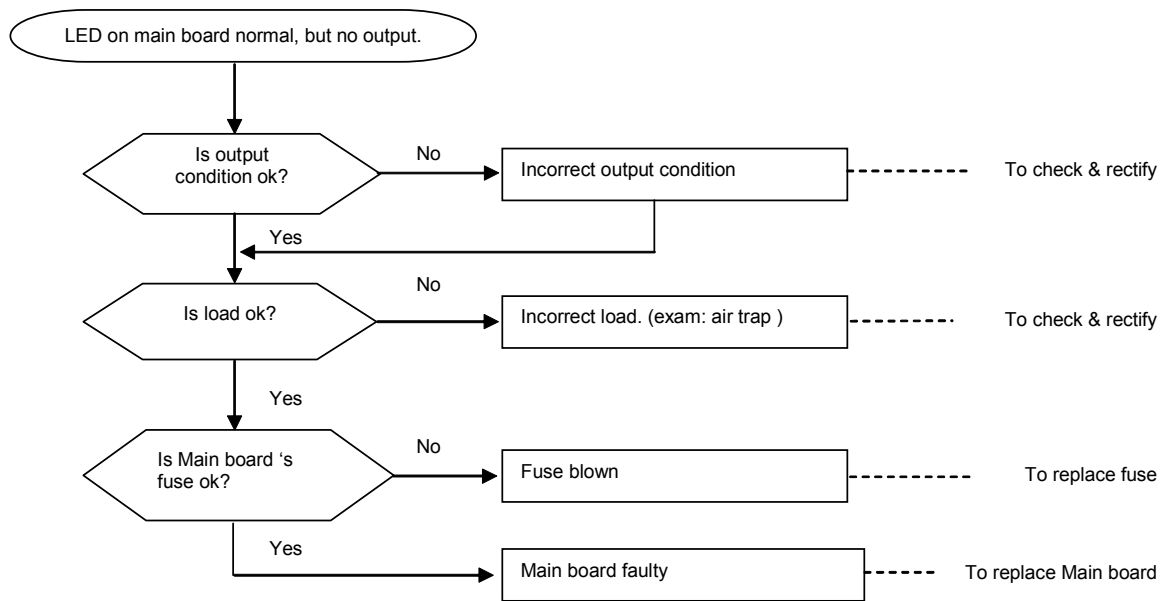
## Error Code

ERROR DISPLAY	ERROR DESCRIPTION	RESET (default)	CONTROL MEASURE				
			PUMP	SYSTEM1		SYSTEM 2	
				COMP	FAN	COMP	FAN
Phase Missing	Phase missing	Manual	OFF	OFF	OFF	OFF	OFF
Phase Seq Error	Wrong phase sequencing	Manual	OFF	OFF	OFF	OFF	OFF
Memory Error	EEPROM read/write error	Auto	OFF	OFF	OFF	OFF	OFF
Entering Water sensor Open/Short	BPHE water in sensor error	Auto	OFF	OFF	OFF	OFF	OFF
Leaving water sensor Open/Short	BPHE water out sensor error	Auto	OFF	OFF	OFF	OFF	OFF
Outdoor Air sensor Open/Short	Ambient temp sensor error	Auto	OFF	OFF	OFF	OFF	OFF
Water Flow Error	Cv contact opened	Manual	OFF	OFF	OFF	OFF	OFF
Cool Mode Antifreeze	Leaving water temp too low	Auto	OFF	OFF	OFF	OFF	OFF
OV/UN Voltage	Comp High Voltage (>490V)	<460V, Auto	OFF	OFF	OFF	OFF	OFF
OV/UN Voltage	Comp Low Voltage (<310V)	>340V, Auto	OFF	OFF	OFF	OFF	OFF
Pump Overload	Pump OLP closed	Auto	OFF	OFF	OFF	OFF	OFF
IPM Error	IPM over-current or overheat	Auto	-	OFF	OFF	-	-
Comp 1 Overload	Comp 1 overload	Auto	-	OFF	OFF	-	-
Comp 1 Discharge Overheat	Comp 1 discharge overheat	Auto	-	OFF	OFF	-	-
High Pressure 1	System 1 high pressure	Auto	-	OFF	OFF	-	-
Low Pressure 1	System 1 low pressure	Auto	-	OFF	OFF	-	-
Comp 1 Defrost sensor Open/Short	Coil out system 1 sensor error	Auto	-	OFF	OFF	-	-
Comp 1 Suct sensor Open/Short	Suction comp system 1 sensor error	Auto	-	OFF	OFF	-	-
Comp 1 Discharge sensor Open/Short	Discharge comp system 1 sensor error	Auto	-	OFF	OFF	-	-
Coil 1 Inlet Temp Open/Short	Coil In system 1 sensor error	Auto	-	OFF	OFF	-	-
V-Hx Inlet Temp sensor Open/Short	BPHE refrigerant in sensor error	Auto	-	OFF	OFF	-	-
V-Hx Outlet Temp Open/Short	BPHE refrigerant out sensor error	Auto	-	OFF	OFF	-	-
Comp 2 Overload	Comp 2 overload	Auto	-	-	-	OFF	OFF
High Pressure 2	System 2 high pressure	Auto	-	-	-	OFF	OFF
Low Pressure 2	System 2 low pressure	Auto	-	-	-	OFF	OFF
Comp 2 Defrost sensor Open/Short	Coil out system 2 sensor error	Auto	-	-	-	OFF	OFF
Comp 2 Discharge sensor Open/Short/Overheat	Discharge comp system 2 sensor error	Auto	-	-	-	OFF	OFF

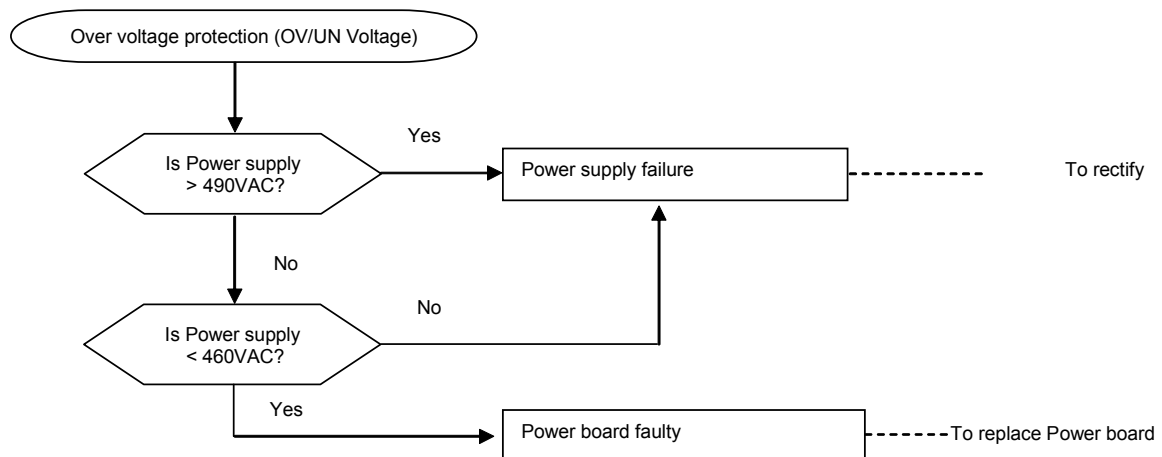
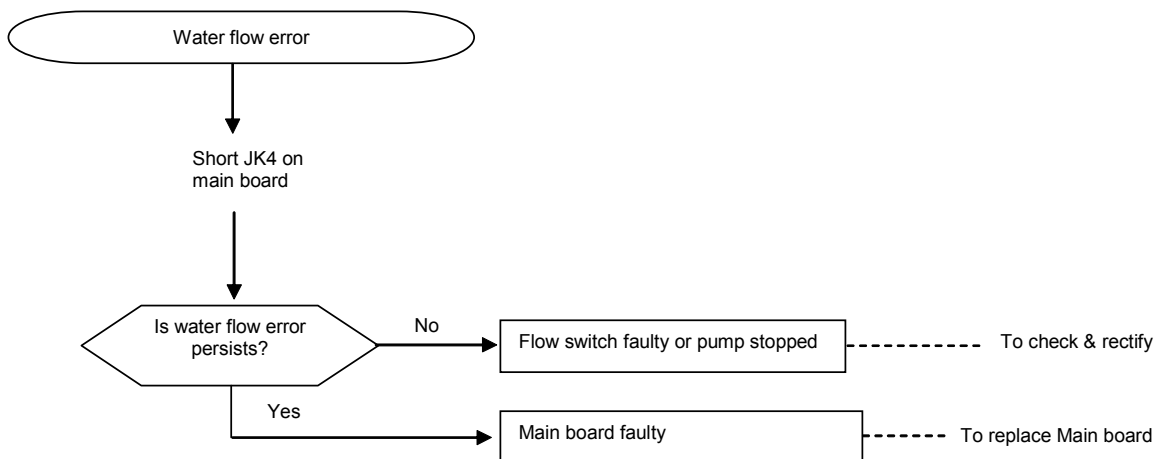


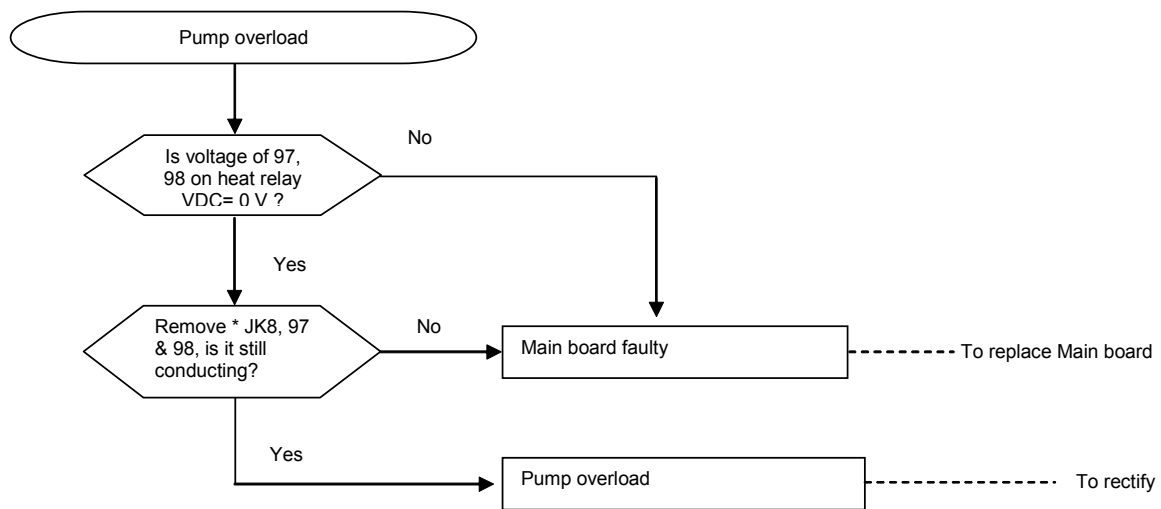
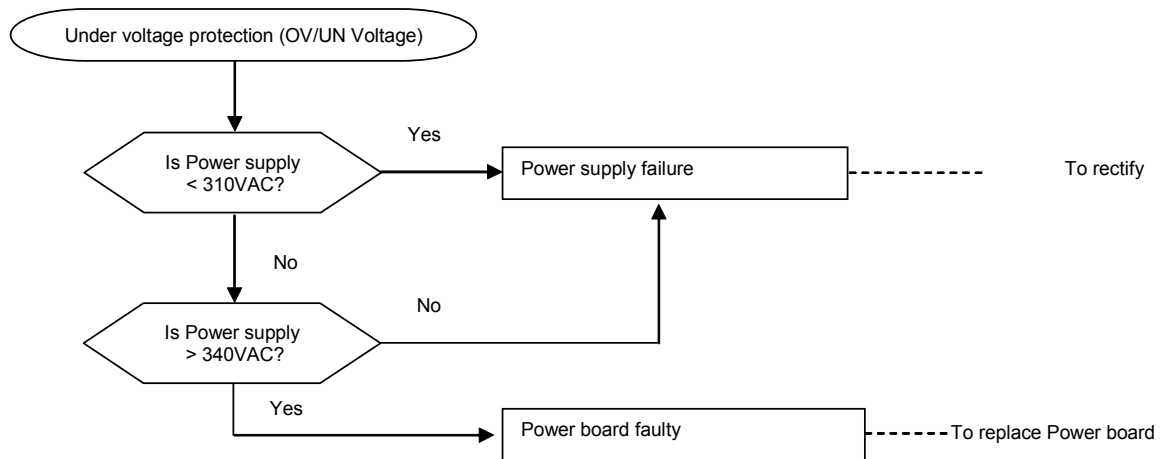
## Diagnostic flow chart



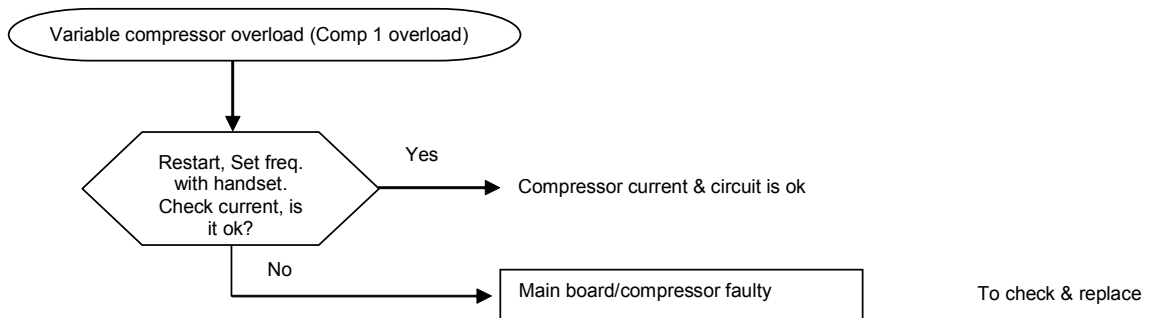
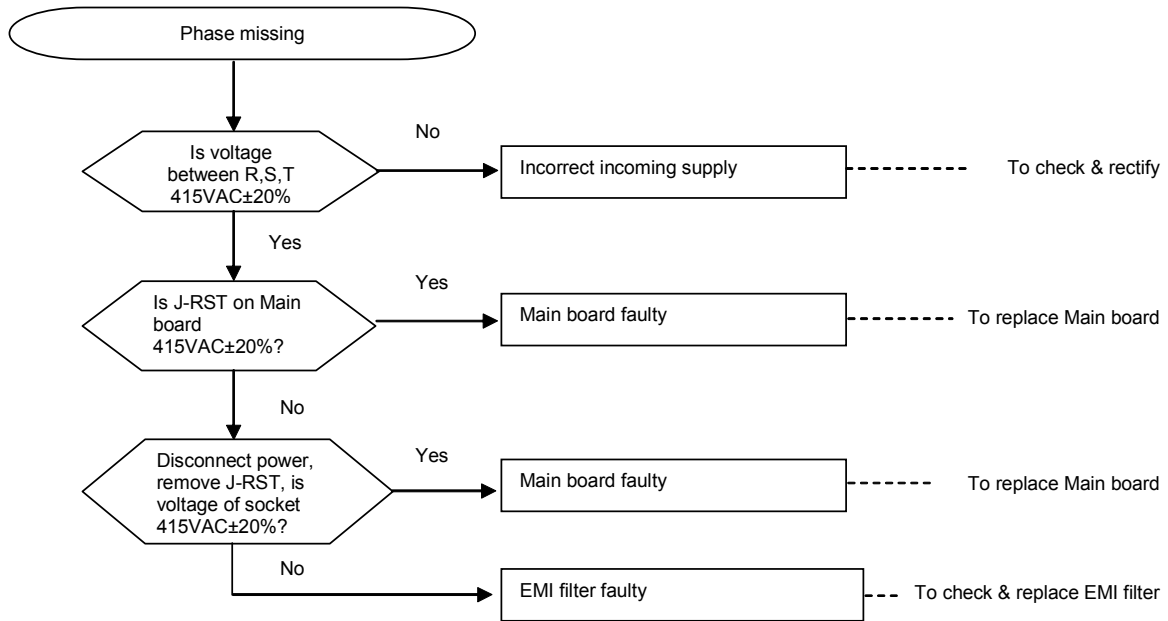


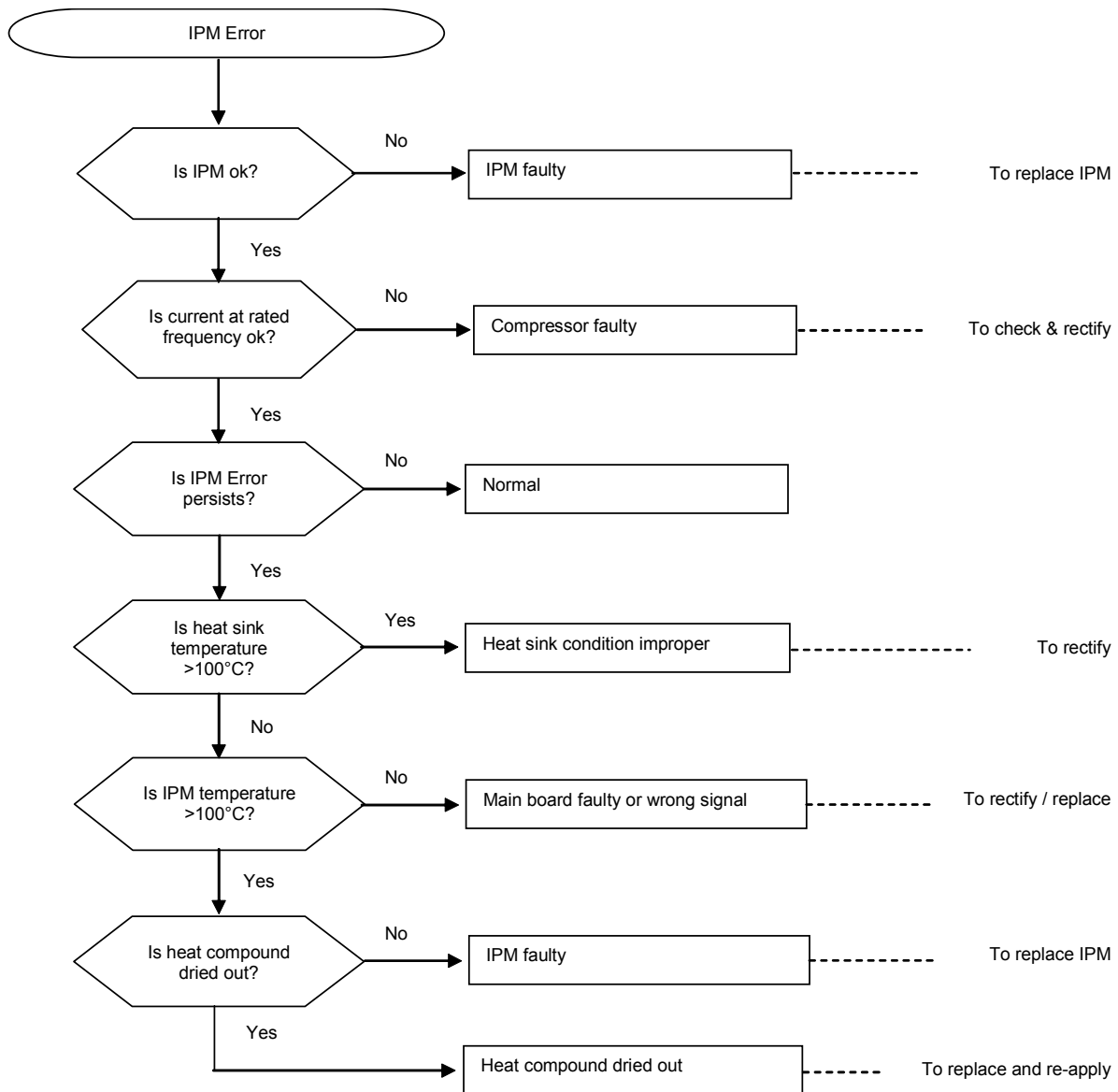
\* Faulty fuse should be replaced after the confirmation of IPM & compressor.

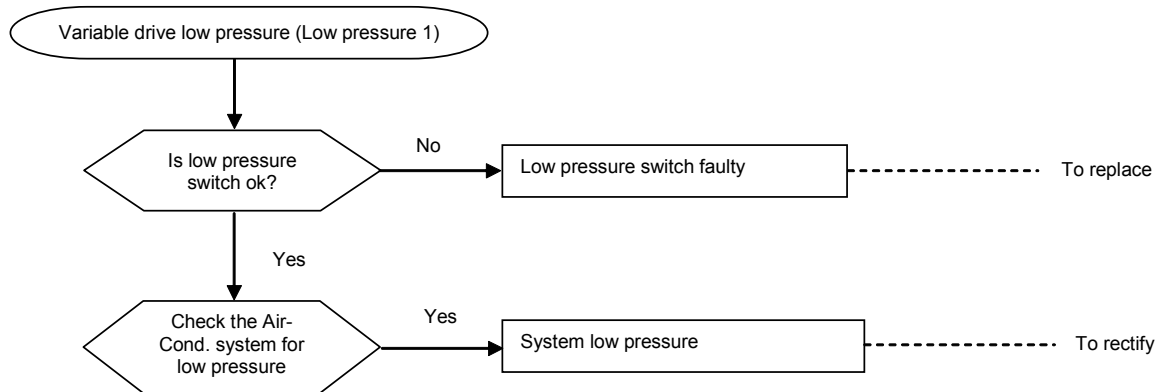
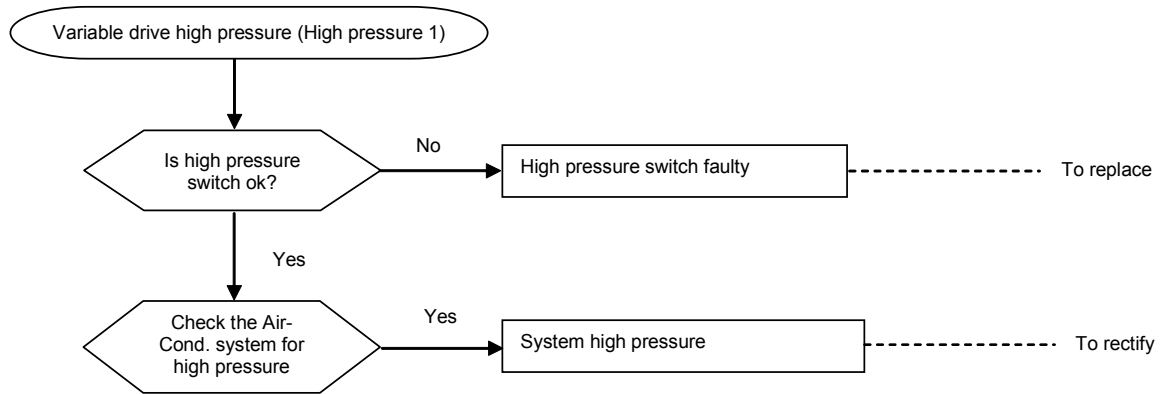


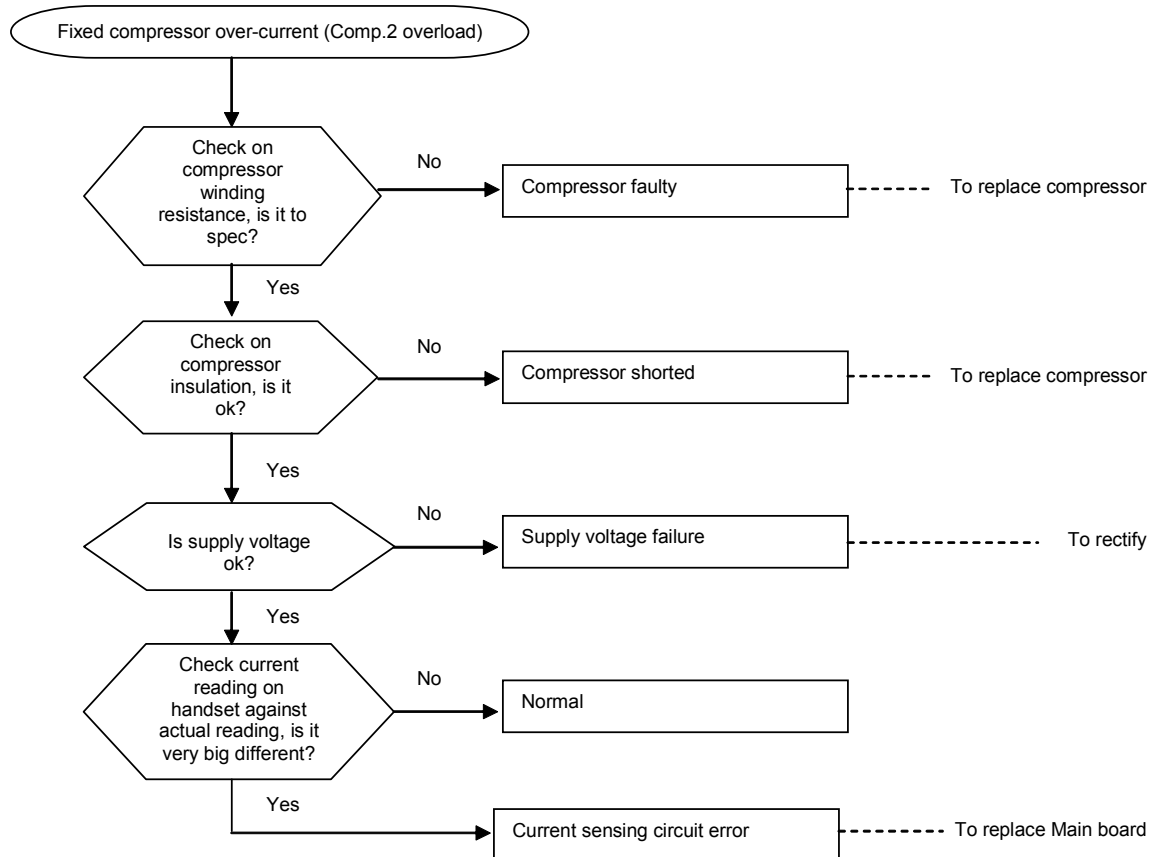
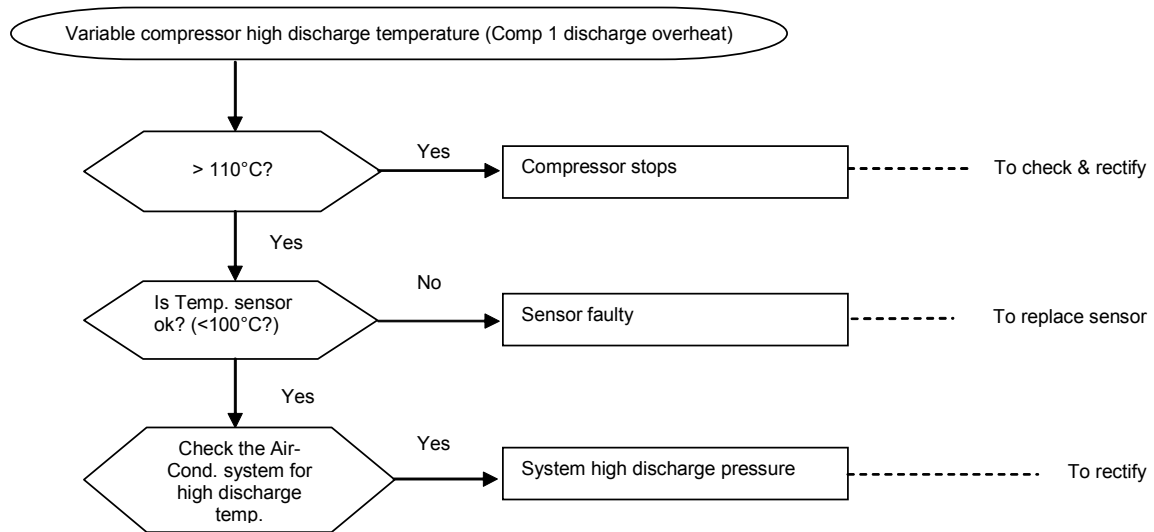


\* JK8 on main board





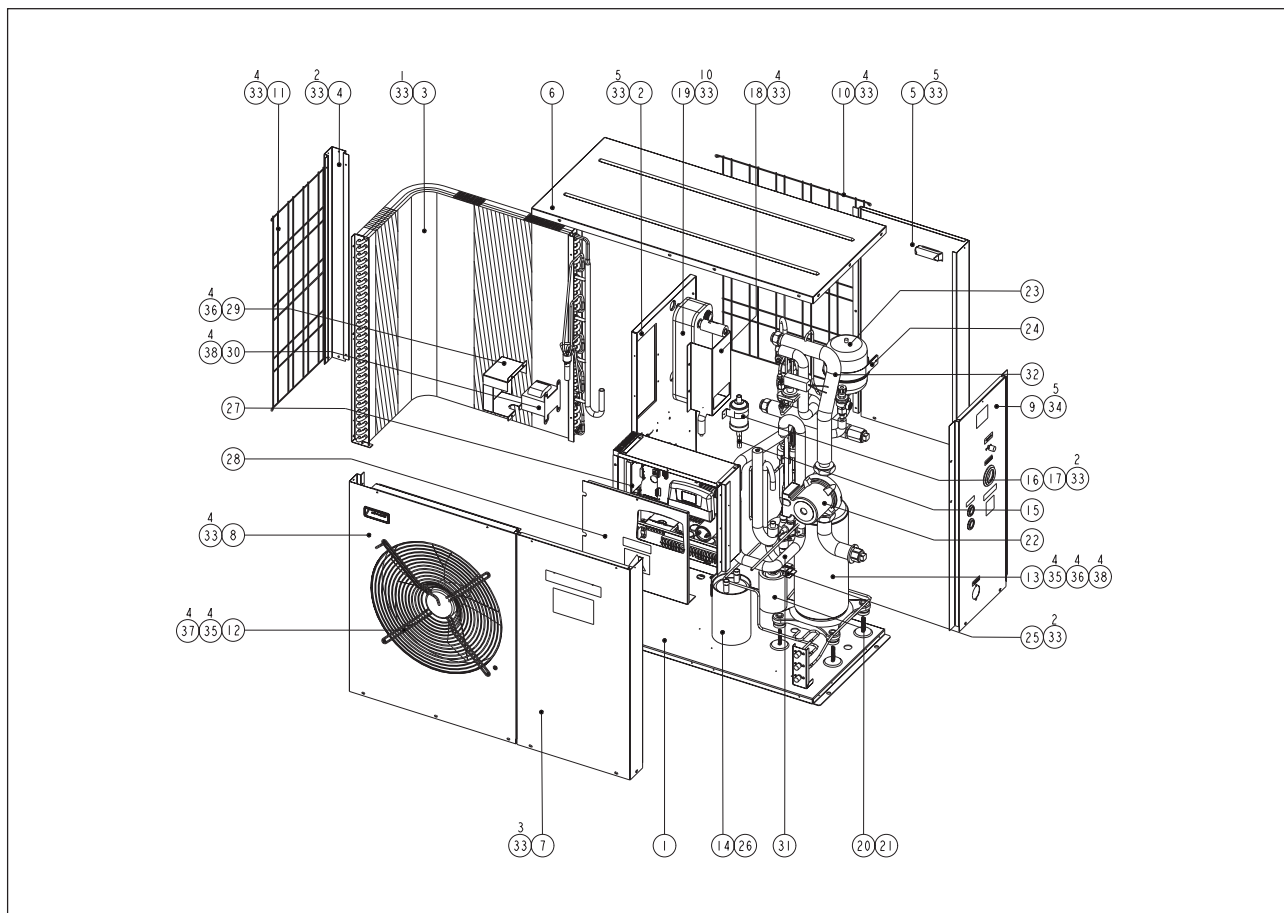






# Exploded View and Part Lists

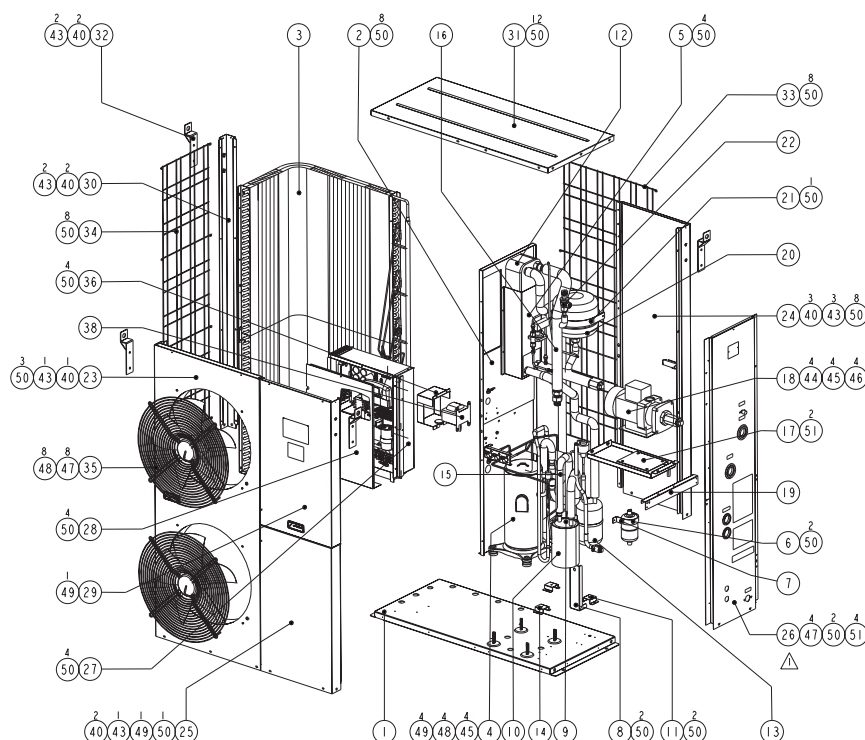
Model : M5ACV 030CR



No	Description	Part no	No	Description	Part no
1	ASSY, BASE PAN	R50 01 4 079444	19	COMPENSATOR AFB-11	R02 16 4 036982
2	ASSY, PANEL PARTITION	R50 01 4 079447	20	INS. COMPENSATOR BODY	-
3	ASSY, COIL	R50 02 4 082968	21	WATER PUMP UPS25-125	R04 13 9 018353
4	PANEL, SUPPORT PILLAR	R01 01 4 058974	22	EXPANSION TANK 2L ELBI	R05 01 9 018922
5	STRUCTURE REAR RIGHT	R01 01 4 069935	23	CLAMP, EXPANSION TANK	R01 01 4 072222
6	PANEL TOP	R01 01 4 064936	24	SUPPORT, TUBE	R01 01 4 063180
7	STRUCTURE FRONT RIGHT	R01 01 4 069936	25	INS, ACCUMULATOR BODY	-
8	ASSY, PANEL ORIFICE	R50 01 4 060810	26	ASSY, TERMINAL BOX MAIN	R50 04 4 082101
9	PANEL RIGHT	R01 01 4 079475	27	COVER CONTROL BOX	R01 01 4 082098
10	COIL GUARD, BACK	R01 02 4 058986	28	PANEL, COVER REACTOR	R01 01 4 081033
11	COIL GUARD, LEFT	R01 02 4 058985	29	REACTOR	-
12	ASSY, FAN MOTOR MORRILL	R50 03 9 019117	30	SCREW, PTT SUS M4x12mm	R07 01 9 010836
13	COMP. ASSY ANV33FKBMT	R50 04 9 024773	31	SCREW, JD COATING PTS M5 x 16	R07 01 9 010843
14	ACCUMULATOR, R65W	R02 11 9 016393	32	NUT, C/W FLANGE M8	R07 02 4 059149
15	CLIP, FILTER DRIER	R01 01 4 071927	33	SPACER	R01 02 9 024769
16	FILTER DRIER	R02 16 9 018760	34	WASHER, FLAT	R07 04 4 003869
17	CLAMP, BPHE	R01 01 4 061321	35	WASHER, FLAT	R07 01 4 003768
18	ASSY, BPHE	R50 02 4 080515	36	SCREW, JD COATING PTT M5x12	R07 01 9 010838

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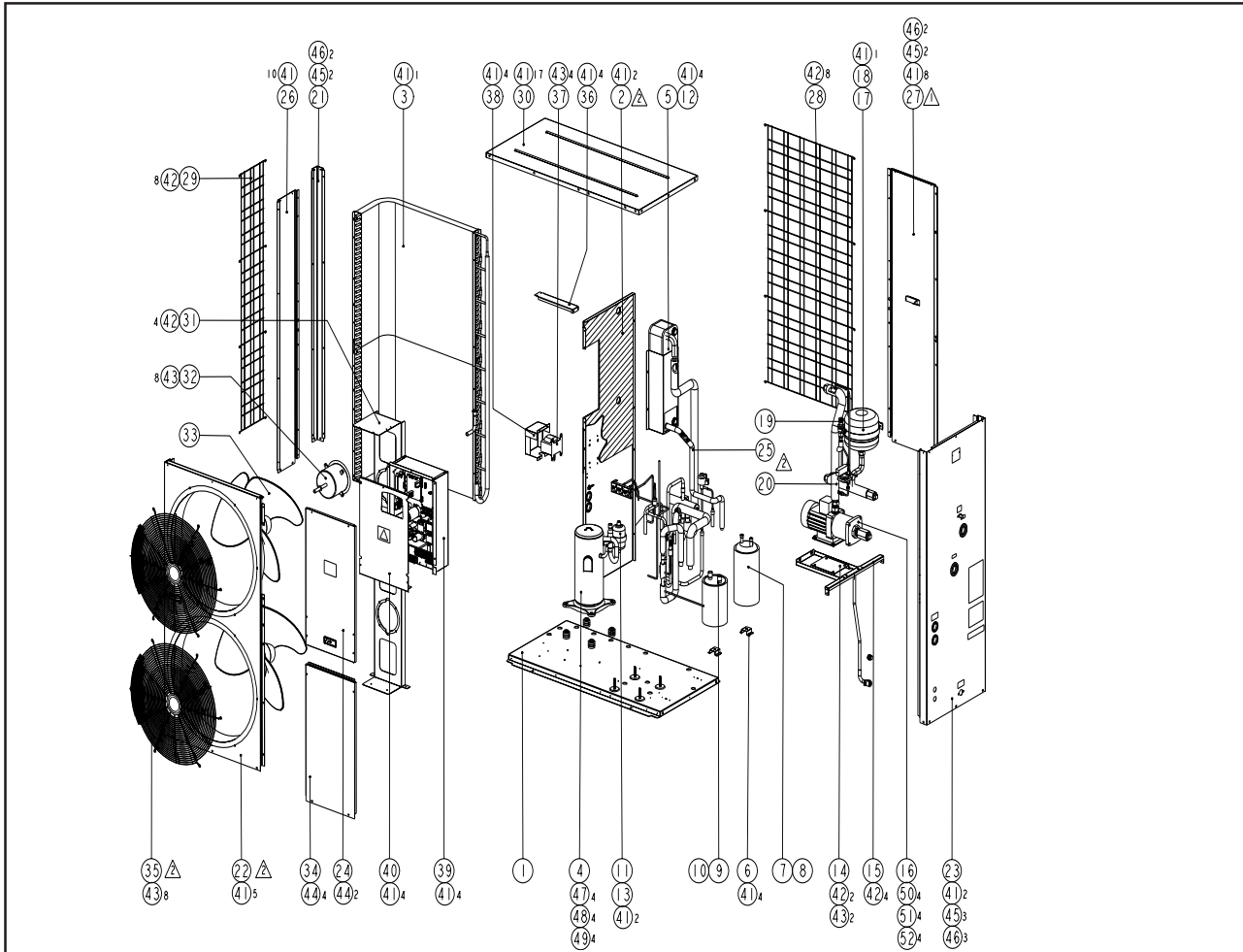
## Model : M5ACV 055CR



No	Description	Part no	No	Description	Part no
1	ASSY, PANEL BASE	R50 01 4 079682	25	ASSY, TERMINAL BOX MAIN	R50 04 4 082048
2	ASSY, PANEL PARTITION	R50 01 4 080005	26	ASSY, COVER CONTROL BOX	R01 01 4 082049
3	ASSY, COIL	R50 02 4 079683	27	ASSY, STRUCTURE FRONT RIGHT TOP	R50 01 4 082086
4	COMP. ASSY ANV47FKBMT	R50 04 9 024220	28	ASSY, SUPOPRT PILLAR	R50 01 4 062762
5	CLAMP, BPHE	R01 01 4 061748	29	ASSY, INS. PANEL TOP	R01 01 4 064936
6	CLIP, FILTER DRIER	R01 01 4 071226	30	ASSY, SUPORT HOISTING BRACKET	R50 01 4 022906
7	FILTER DRIER	R02 16 4 034987	31	COIL GUARD, BACK	R01 02 4 058841
8	SUPPORT, ACCUMULATOR	R01 01 4 079828	32	COIL GUARD, LEFT	R01 02 4 058840
9	ACCUMULATOR, R65W	R02 11 9 016393	33	ASSY, FAN MOTOR MORRILL	R50 03 9 019117
10	INS. ACCUMULATOR BODY	-	34	PANEL, COVER REACTOR	R01 01 4 081033
11	SUPPORT, ACCU. & LQD. RECEIVER	R01 01 4 059624	35	BUSH, RUBBER	R11 01 4 001876
12	ASSY, BPHE	R50 02 4 079933	36	REACTOR	-
13	LIQUID RECEIVER	R02 11 9 020906	37	WASHER, SPRING	R07 04 4 002246
14	SUPPORT, TUBE	R01 01 4 063180	38	SPACER	R01 02 9 024769
15	ASSY, PUMP BASE	R50 01 4 065859	39	RUBBER GROMMET	R11 04 4 024768
16	WATER PUMP CH2-30	R04 13 9 021184	40	BOLT, HEX M8 x20	R07 03 4 003822
17	PLATE, PUMP SUPPORT	R01 01 4 061851	41	SCREW, PHILIP PAN HEAD M6 x15mm	R07 01 4 010157
18	EXPANSION TANK	R05 01 9 018923	42	WASHER SPRING	R07 04 4 003769
19	CLAMP, EXPANSION TANK	R01 01 4 068177	43	WASHER, FLAT	-
20	PRESSURE RELIEF VALVE	R05 02 4 050808	44	SCREW, JD COATING PTS M5 x16	R07 01 9 010843
21	ASSY, PANEL ORIFICE	R50 01 4 060812	45	WASHER, FLAT	R07 04 4 003869
22	ASSY, STRUCTURE REAR RIGHT	R50 01 4 064939	46	SCREW, SELF TAPPING	R07 01 4 002248
23	ASSY, STRUCTURE, FRONT RIGHT TOP	R50 01 4 082086	47	SCREW, PTT SUS M4x12	R07 01 9 010836
24	PANEL RIGHT	R01 01 4 079937	48	SCREW, JD COATING PTT M5 x12	R07 01 9 010838

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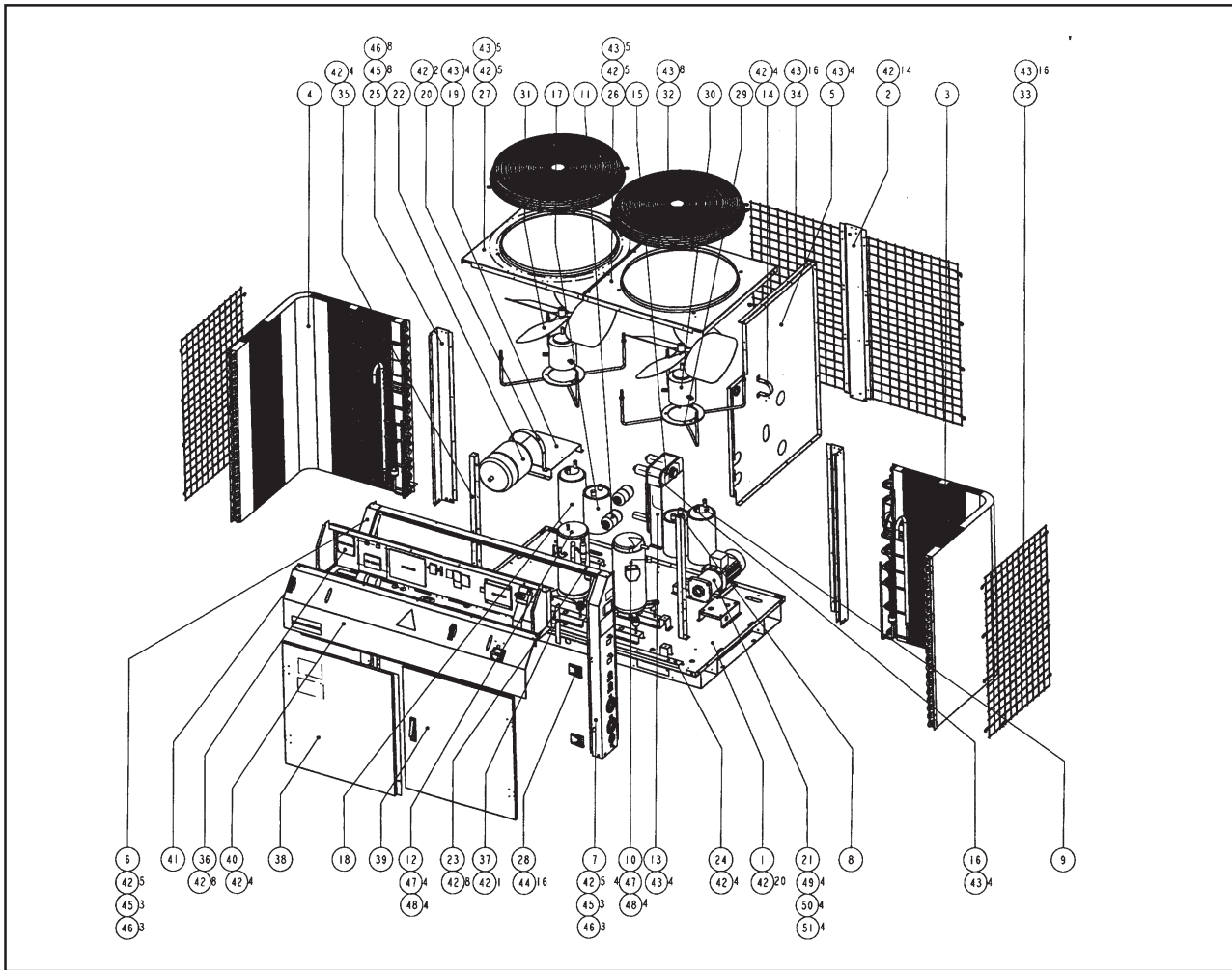
## Model : M5ACV 075CR



No	Description	Part no	No	Description	Part no
1	ASSY, BASE PAN	R50 01 4 078737	27	STRUCTURE REAR RIGHT	R01 01 4 078641
2	ASSY, PANEL PARTITION	R50 01 4 078744	28	COIL GUARD, BACK	R01 02 4 078750
3	ASSY, COIL	R50 02 4 078902	29	COIL GUARD RIGHT	R01 02 4 078751
4	COMP. ASSY ANV47FKBMT	R50 04 9 024220	30	INS. PANEL TOP	R01 01 4 078652
5	ASSY, BPHE	R02 20 9 024775	31	ASSY, BRACKET MOTOR	R50 01 4 085856
6	SUPPORT, ACCU., & LIQUID RECEIVER	R01 01 4 059624	32	MOTOR	R03 03 9 016103
7	LIQUID RECEIVER	R02 11 9 024280	33	FAN BLADE	R03 01 3 028160
8	INS, LIQUID RECEIVER BODY	-	34	STRUCTURE, FRONT RIGHT BOTTOM	R01 01 4 078643
9	ACCUMULATOR	R02 11 9 015506	35	FAN BLADE	R01 02 4 078747
10	INS, ACCUMULATOR BODY	-	36	SUPPORT, MOTOR BRACKET	R01 01 4 078917
11	FILTER DRIER	R02 16 4 034987	37	REACTOR	-
12	CLAMP, BPHE	R01 01 4 078653	38	PANEL, COVER REACTOR	R01 01 4 081033
13	CLIP, FILTER DRIER	R01 01 4 071226	39	ASSY, TERMINAL BOX MAIN	R50 04 4 083597
14	ASSY, PUMP BASE	R50 01 4 082718	40	COVER TERMINAL BOX	R01 01 4 078654
15	PLATE, PUMP SUPPORT	R01 01 4 078637	41	SCREW, M4x12	R07 01 9 010836
16	WATER PUMP CH4-40(AUUE)	R04 13 9 021185	42	SCREW, M5x16	R07 01 9 010839
17	EXPANSION TANK 5L	R05 01 9 018923	43	SCREW, 5x16	R07 01 9 010843
18	CLAMP, EXPANSION TANK	R01 01 4 068177	44	SCREW, TRUSS HEAD	R07 01 4 002221
19	PRESSURE RELIEF VALVE	R05 02 4 050808	45	BOLT HEX M8x20	R07 03 4 003822
20	ASSY, WATER PIPING	-	46	WASHER SPRING	R07 04 4 002246
21	PANEL, SUPPORT PILLAR	R01 01 4 078638	47	NUT, C/W FLANGE M8	R07 02 4 059149
22	ASSY, PANEL ORIFICE	R50 01 4 078740	48	RUBBER GROMMET	-
23	ASSY, PANEL RIGHT (MAIN)	R50 01 4 086750	49	SPACER	-
24	ASSY, STRUCTURE FRONT RIGHT TOP	R01 01 4 078642	50	SCREW, PHILIP PAN HEAD	R07 01 4 010157
25	ASSY, UNIT TUBING	-	51	WASHER, SPRING	R07 04 4 003769
26	PANEL, SIDE LEFT	R01 01 4 079744	52	WASHER, FLAT	R07 01 4 003768

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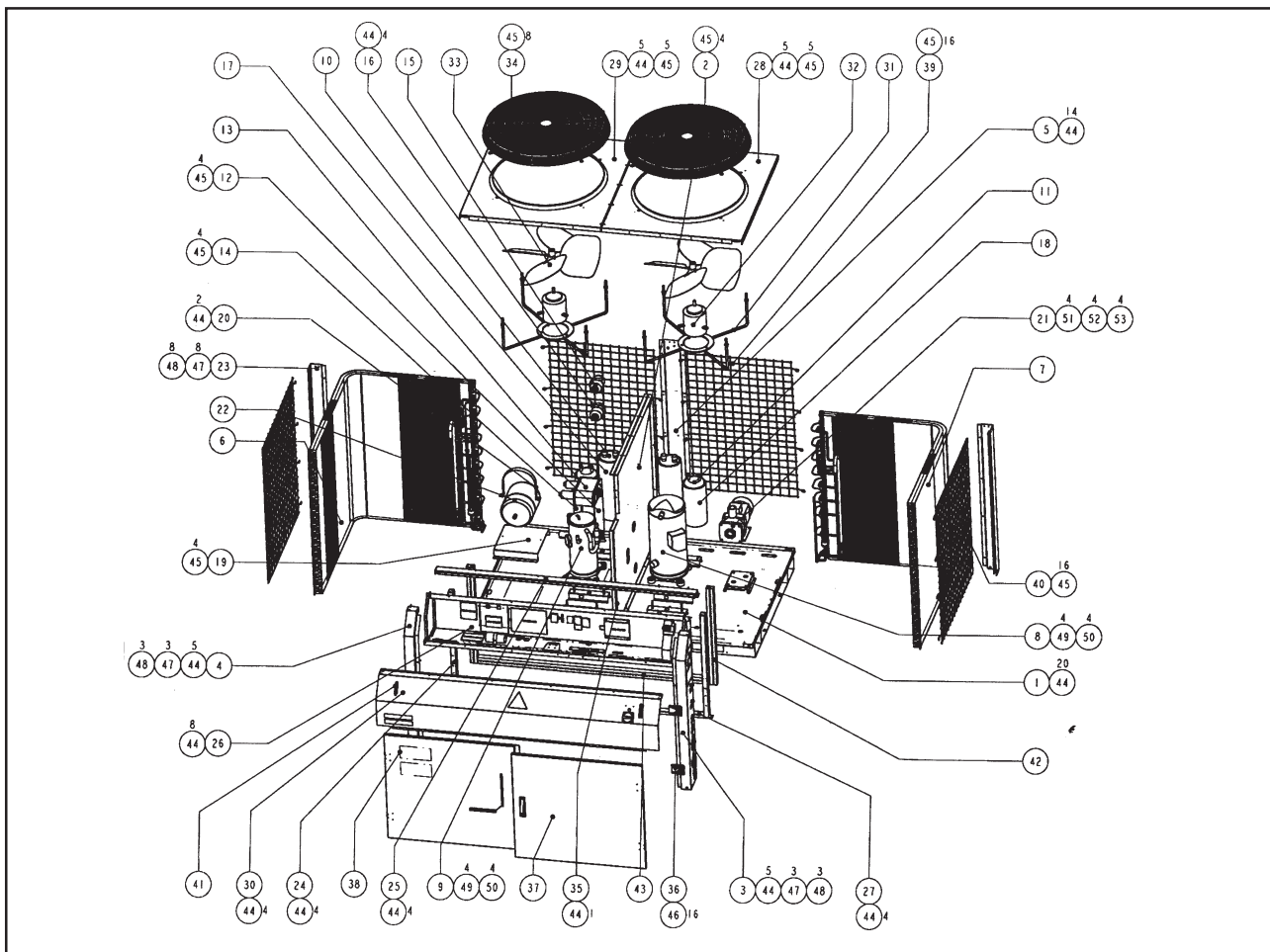
## Model : M5ACV100CR



NO	DESCRIPTIONS	PART NO	NO	DESCRIPTIONS	PART NO
1	ASSY, PANEL BASE MAIN	R50 01 4 077857	27	PANEL, ORIFICE LEFT	R01 01 4 082120
2	COIL SUPPORT	R01 01 4 077862	28	HINGE, DOOR	R01 02 9 016097
3	ASSY, COIL RIGHT	R50 01 4 077891	29	BRACKET, MOTOR	R01 02 4 096383
4	ASSY, COIL LEFT	R50 01 4 077893	30	MOTOR	R03 03 9 015508
5	ASSY, PARTITION PANEL	R50 01 4 077863	31	FAN BLADE 24"	R03 02 9 015512
6	LEFT PANEL	R01 01 4 082112	32	FAN GUARD	R01 02 4 055748
7	RIGHT PANEL	R01 01 4 082113	33	COIL GUARD, LEFT/RIGHT	R01 02 4 055744
8	ACCUMULATOR	R02 11 9 015506	34	COIL GUARD, BACK	R01 02 4 055745
9	LIQUID RECEIVER	R02 11 9 024280	35	PANEL, TERMINAL BOX SUPPORT	R01 01 4 054717
10	COMPRESSOR ASSY	R50 04 9 024063	36	ASSY, TERMINAL BOX MAIN	R50 04 4 078888
11	FILTER DRIER	R02 16 4 034987	37	PLATE, PARTITION	R01 01 4 056603
12	COMP. ASSY INVERTER	R50 04 9 024220	38	DOOR PANEL LEFT	R50 01 4 056078
13	BRACKET, BPHE	R01 01 4 077865	39	DOOR PANEL RIGHT	R50 01 4 074752
14	CLIP, FILTER DRIER	R01 01 4 054752	40	FRONT PANEL MAIN	R01 01 4 082114
15	ASSY, BPHE	R02 20 9 024222	41	ASSY, PANEL HOOK	R50 12 9 016096
16	CLAMP, BPHE	R01 01 4 077866	42	SCREW, PTT SUS M4X12	R07 01 9 010836
17	INS, ACCUMULATOR BODY	-	43	SCREW, JD COATING P.T. M5X16	R07 01 9 010839
18	INS, LIQUID RECEIVER BODY	-	44	SCREW, TRUST HEAD PHILIP	R07 01 4 002221
19	SUPPORT, EXPANSION TANK	R01 01 4 054712	45	BOLT HEX M8X20	R07 03 4 003822
20	CLAMP, EXPANSION TANK	R01 01 4 054754	46	WASHER, SPRING	R07 04 4 002246
21	WATER PUMP CH4-40	R04 13 9 021185	47	NUT, C/W FLANGE M8	-
22	TANK, EXPANSION 8L	R05 01 4 001497	48	SPACER	-
23	PANEL, SUPPORT FRONT	R01 0 1 4 082118	49	SCREW, PHILP PAN HEAD	R07 01 4 010157
24	SUPPORT, FLUTTED WIRE	R01 01 4 054762	50	WASHER, SPRING	R07 04 4 003769
25	STRUCTURE, BACK L/R	R01 01 4 054710	51	WASHER, FLAT	R07 01 4 003768
26	PANEL, ORIFICE RIGHT	R01 01 4 082121			

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## Model : M5ACV135CR

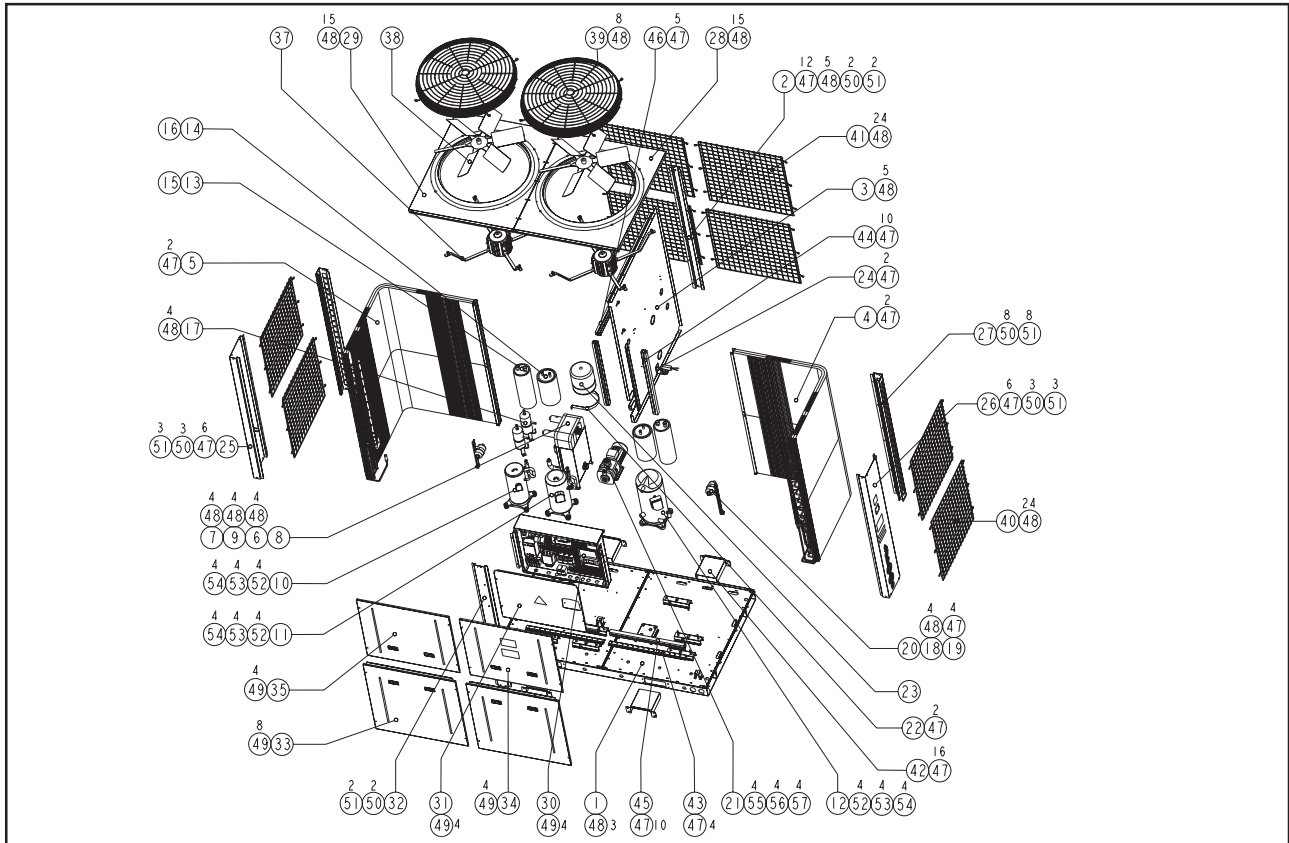


NO	DESCRIPTIONS	PART NO	NO	DESCRIPTIONS	PART NO
1	ASSY, PANEL BASE MAIN	R50 01 4 079125	28	PANEL, RIGHT ORIFICE	R01 01 4 082123
2	ASSY, PARTITION PANEL	R50 01 4 079128	29	PANEL, LEFT ORIFICE	R01 01 4 082122
3	RIGHT PANEL	R01 01 4 082113	30	FRONT PANEL MAIN	R01 01 4 082116
4	LEFT PANEL	R01 01 4 082112	31	BRACKET, MOTOR	R01 01 4 096382
5	COIL SUPPORT	R01 01 4 077862	32	MOTOR	R03 03 9 018421
6	ASSY, COIL LEFT	R50 02 4 079161	33	FAN BLADE 26"	R03 02 9 015513
7	ASSY, COIL RIGHT	R50 02 4 079163	34	FAN GUARD	R01 02 4 055747
8	COMPRESSOR ASSY	R50 04 9 024296	35	PLATE, PARTITION	R01 01 4 056603
9	COMP. ASSY INVERTER	R50 04 9 024220	36	HINGE, DOOR	R01 02 9 016097
10	ACCUMULATOR	R02 11 9 015245	37	ASSY DOOR PANEL RIGHT	R50 01 4 074750
11	LIQUID RECEIVER	R02 11 9 024280	38	ASSY, DOOR PANEL LEFT	R50 01 4 055347
12	BRACKET, BPHE	R01 01 4 077865	39	COIL GUARD, BACK	R01 02 4 055743
13	ASSY, BPHE	R50 02 4 079159	40	COIL GUARD, LEFT/RIGHT	R01 02 4 055746
14	CLAMP, BPHE	R01 01 4 079131	41	ASSY, PANEL HOOK	R50 12 9 016096
15	FILTER DRIER	R02 16 4 034987	42	PVC, TRUNKING	R12 02 4 057612
16	CLIP, FILTER DRIER	R01 01 4 054752	43	PVC, TRUNKING	-
17	INS, ACCUMULATOR BODY	-	44	SCREW, PTT SUS M4X12	R07 01 9 010836
18	INS, LIQUID RECEIVER BODY	-	45	SCREW, JD COATING P.T.	R07 01 9 010839
19	SUPPORT, EXPANSION TANK	R01 01 4 054712	46	SCREW, PHILP PAN HEAD	R07 01 4 002221
20	CLAMP, EXPANSION TANK	R01 01 4 054754	47	BOLT HEX M8X20	R07 03 4 003822
21	WATER PUMP CH8-30	R04 13 9 021186	48	WASHER, SPRING	R07 04 4 002246
22	TANK, EXPANSION 8L	R05 01 4 001497	49	NUT, C/W FLANGE M8	-
23	STRUCTURE, BACK L/R	R01 01 4 054710	50	SPACER	-
24	PANEL, TERMINAL BOX SUPPORT	R01 01 4 054717	51	SCREW, PHILIP PAN HEAD	R07 01 4 010157
25	PANEL, SUPPORT FRONT	R01 01 4 082119	52	WASHER, SPRING	R07 04 4 003769
26	ASSY, TERMINAL BOX MAIN	R50 04 4 079552	53	WASHER, FLAT	R07 01 4 003768
27	SUPPORT, WIRE BOARD	R01 01 4 054724			

1) ALL SPECIFICATIONS ARE SUBJECT TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE



## Model : M5ACV210CR



NO	DESCRIPTION	PART NO	N O	DESCRIPTION	PART NO
1	ASSY, PANEL BASE MAIN	R50 01 4 084901	30	ASSY, CONTROL BOX	R50 04 4 089239
2	PANEL, COIL SUPPORT	R01 01 4 083984	31	ASSY, COVER TERMINAL BOX	R01 01 4 084609
3	ASSY, PANEL PARTITION	R50 01 4 083980	32	ASSY, PANEL CENTER	R50 01 4 084213
4	ASSY, COIL RIGHT (GOLD FIN)	R50 02 4 084041	33	PANEL, FRONT BOTTOM	R01 01 4 086996
5	ASSY, COIL LEFT (GOLD FIN)	R50 02 4 084040	34	PANEL FRONT RIGHT TOP	R50 01 4 086994
6	BRACKET, BPHE	R01 01 4 084911	35	PANEL FRONT LEFT TOP	R50 01 4 085254
7	PANEL, SUPPORT BPHE	R01 01 4 087701	36	MOTOR, YDK550-8AC	R03 03 9 028560
8	ASSY, BPHE	R50 02 4 084902	37	BRACKET, FAN MOTOR 32"	R01 02 4 051691
9	CLAMP, BPHE	R01 01 4 084910	38	FAN BLADE	R03 01 9 021351
10	ASSY, COMP. ANV47FKBMT MIT.	R50 04 9 024220	39	FAN GUARD 32"	R01 02 4 048691
11	ASSY, COMP. BN65YFAMT SIAM	R50 04 9 026991	40	COIL GUARD, LEFT/RIGHT	R01 02 4 085033
12	ASSY. COMP. ZP137KCE-TFD COPELAND	R50 04 9 026989	41	COIL GUARD, BACK	R01 02 4 086957
13	ACCUMULATOR (A-AS 5179)	R02 11 9 015245	42	PANEL, COVER	R01 01 4 087049
14	LIQUID RECEIVER	R02 11 9 028389	43	SUPPORT, WIRE BOARD	R01 01 4 087979
15	INS. ACCUMULATOR BODY	R06 01 4 056067	44	PVC TRUNKING (33.0 x 45.0 x 808.0)	R12 02 4 087981
16	INS. LIQUID RECEIVER BODY	R06 01 4 088638	45	PVC TRUNKING (33.0 x 45.0 x 710.0)	R12 02 4 057612
17	OIL SEPERATOR	R02 11 9 028561	46	PVC TRUNKING (33.0 x 45.0 x 860.0)	R12 02 4 087980
18	PANEL, SUPPORT FILTER DRIER	R01 01 4 084043	47	SCREW, PTT SUS M4x12	R07 01 9 010836
19	CLIP, FILTER DRIER	R01 01 4 054752	48	SCREW, JD COATING P.T. M5x16	R07 01 9 010839
20	FILTER DRIER, BFK165S	R02 16 4 034987	49	SCREW, JD COATING P.T. S 5x16	R07 01 9 010843
21	WATER PUMP, GRUNDFOS	R04 13 9 026993	50	BOLT HEX M8x20	R07 03 4 003822
22	CLAMP, EXPANSION TANK	R01 01 4 054754	51	WASHER, SPRING	R07 04 4 002246
23	EXPANSION TANK 8L	R05 01 4 001497	52	NUT, C/W FLANGE M8	R07 02 4 059149
24	BRACKET, DEF. PRESS SWITCH	R01 01 4 096131	53	RUBBER GROMMET	-
25	ASSY, SIDE PANEL LEFT (MAIN)	R50 01 4 085865	54	SPACER	-
26	ASSY, SIDE PANEL RIGHT (MAIN)	R50 01 4 085866	55	SCREW, PHILIP PAN HEAD M6x15mm	R07 01 4 010157
27	STRUCTURE, BACK L/R	R01 01 4 083991	56	WASHER, SPRING	R07 04 4 003769
28	PANEL, RIGHT ORIFICE	R01 01 4 083986	57	WASHER, FLAT	R07 01 4 003768
29	PANEL, LEFT ORIFICE	R01 01 4 083985			

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